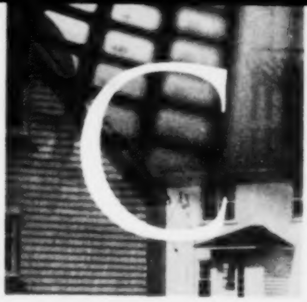
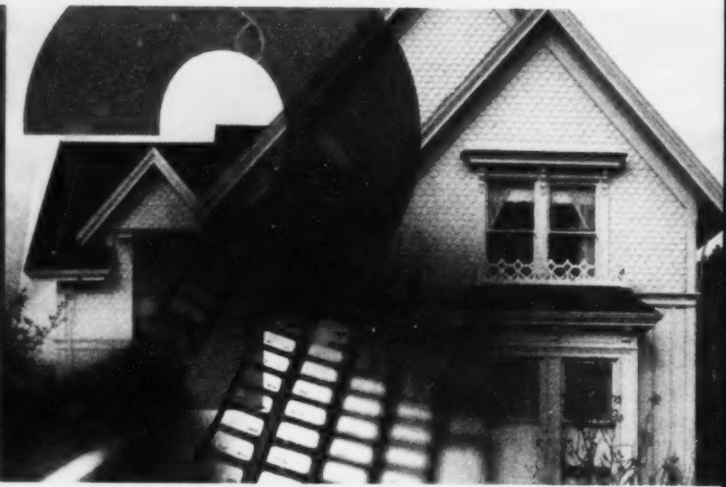


COMPENDIUM OF RESEARCH

1998-1999

SOCIAL, ECONOMIC AND TECHNICAL RESEARCH



CMHC SCHL

HOME TO CANADIANS
Canada

COMPENDIUM
OF RESEARCH
1998-1999

Issued also in French under the title: ***Compendium de recherche***

Publié aussi en français sous le titre: ***Compendium de recherche***

Canada Mortgage and Housing Corporation /

Société canadienne d'hypothèques et de logement, 2002

NH 15-36/1998-1999

INTRODUCTION

Canada Mortgage and Housing Corporation, the federal Government's housing agency, is responsible for administering the National Housing Act.

This legislation is designed to aid in the improvement of housing and living conditions in Canada. As a result, the Corporation has interests in all aspects of housing and urban growth and development.

Under Part IX of this Act, the Government of Canada provides funds to CMHC to conduct research into the social, economic and technical aspects of housing and related fields, and to undertake the publishing and distribution of the results of this research. CMHC therefore has a statutory responsibility to make widely available, information which may be useful in the improvement of housing and living conditions.

This Compendium of Research has been compiled to publicize and increase access to the research reports produced under research programs sponsored by the Corporation during 1998 and 1999. A few reports not included in the earlier compendiums have also been added.

ARRANGEMENT

The abstracts of completed research reports and publications are arranged by broad subject areas. A title index can be found at the end of the Compendium.

AVAILABILITY OF REPORTS

Most research reports are available from the Canadian Housing Information Centre.

Three easy and convenient ways to order:

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ADDRESSING SPECIAL HOUSING NEEDS IN FIRST NATION COMMUNITIES

In the 1991 Census, the rate of disability reported by Aboriginal adults was twice as high as that in the Canadian population as a whole. Specifically in the area of housing, the report on the Round Table on Disabilities in First Nations Housing in 1993 referred to a range of problems including a lack of alternative housing, the need to review policies to identify barriers to service provision, and the inappropriateness of prevailing barrier free home designs for Indian reserves.

"Completing the Circle", the Standing Committee report on Aboriginal people with disabilities talked of the need for co-operation and support at the community level if the problems of disabled Aboriginal people are to be addressed. The Department of Indian and Northern Development evaluation of their contribution to the National Strategy for the Integration of Persons with Disabilities found that lack of information is the most significant barrier to First Nations people in finding the help they need.

Using the findings of these initiatives as a framework, as well as the findings of the Home Adaptations for Seniors Independence evaluation, this study profiles specific on-reserve communities in Atlantic Canada, identifying how they are addressing the housing needs of their disabled members, and on the basis of this, developed strategies and mechanisms for such communities to do it effectively. The report identified recommendations for action by stakeholder groups (Aboriginal organizations in partnership with government) and by individual First Nation communities themselves. It also provided an evaluation of the objectives of the project.

A common element among the recommendations is the need for First Nation disabled people to play a key role in all issues affecting them including: identifying needs, establishing criteria for assistance, making decisions, and being the advocating voice. Another common element is the need for First Nation communities to take a proactive planning approach to meet the special needs of disabled and elderly in their communities, incorporating their needs into the bigger picture of planning for the future of their communities.

The "Completing the Circle" report identified that there were major gaps and administrative problems in meeting the needs of disabled Aboriginals. This research confirmed that in Atlantic Canada First Nation communities there are still a number of problems related to these issues. In particular, this research found that there is concern about the inability, real or perceived, to access provincially funded programs to meet on-reserve needs and the uneven provision of basic support services across the communities.

Prepared by: Rural and Small Town Programme. David Bruce, Senior Associate and Tracey Weatherston, with John Higham and Judy Reid. Ottawa: Canada Mortgage and Housing Corporation, 1998.

AVAILABILITY: Canadian Housing Information Centre

CORE HOUSING NEED AMONG OFF-RESERVE ABORIGINAL LONE PARENTS IN CANADA

This study, based on the 1991 Aboriginal Peoples Survey and Census, explores housing need among Aboriginal lone-parent households living off-reserve. It reports on the very high level of core housing need among these households and examines the reasons for it.

Prepared by Ark Research Associates, Research Manager: Aron Spector. Prepared for: Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: John Engeland. Ottawa: CMHC, 1997.

Order number: PE0281 (61575)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Les besoins de logement des familles monoparentales autochtones hors réserves au Canada.

CORE HOUSING NEED AMONG OFF-RESERVE INUIT, MÉTIS, STATUS AND NON-STATUS INDIANS IN CANADA

This study, based on the 1991 Aboriginal Peoples Survey (APS) and 1991 Census, explores housing need among Inuit, Métis, Status and Non-Status Indian peoples living off-reserve. It profiles the factors that influence the high levels of core housing need experienced by each individual Aboriginal group.

The report brings to light two key conclusions regarding the overall incidence of Aboriginal housing need off-reserve:

- a large proportion of Aboriginal households located in northerly, remote areas of the country occupy housing that is crowded, in need of major repair and lacking adequate bathroom facilities. These physical housing problems are most commonly experienced in Labrador, the northern Prairies and the Northwest Territories; and,
- Aboriginal households are especially likely to fall into core housing need - that is lacking access to housing that is adequate in condition, suitable in size and affordable - in a number of urban areas in Western Canada, most because they are dedicating high proportions of their income to shelter.

Prepared by Ark Research Associates, Ark Research Manager: Aron Spector. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: John Engeland. Ottawa: CMHC, 1998.

Order Number PEO295 (61578)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Les besoins impérieux de logement des Inuit, Métis et indiens inscrits et non inscrits vivant hors des réserves, au Canada.

RISK MANAGEMENT AND INSURANCE IN ABORIGINAL COMMUNITIES: TWO CASE STUDIES

The cost of insurance is often three times higher in Aboriginal communities than in comparable non-Aboriginal communities. Previous research has shown that less than half of this extra cost can be justified because of the extra risks involved. This report describes two examples of Aboriginal communities who reduced the costs of their insurance through applying a risk management approach and competitive tendering. The 14 Inuit communities of the Kativik Regional Government in Nunavik achieved a decrease of 50% in cost, followed by a further reduction of 20% two years later. The scope of the coverage was improved with the same broker and insurance company as before. The Naskapi Band of Quebec took the same approach. It saved some 70% on the cost of insurance, while improving the quality of its coverage. Here the broker and insurance company changed. Risk management is a continuous and systematic series of activities with three distinct goals: to minimize the likelihood of accidents, to limit their severity, and to ensure that the pre-accident situation can be restored.

Ottawa: Canada Mortgage and Housing Corporation, 1999. 16 pages.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Assurances et gestion des risques en milieu autochtone.

SELF BUILD ABORIGINAL HOUSING USING BALEWALL CONSTRUCTION: CUMBERLAND HOUSE, SASKATCHEWAN: FINAL REPORT

This initiative, undertaken in a remote aboriginal community in north-eastern Saskatchewan has developed an affordable housing model that can be replicated in this and other communities. It focused on testing the feasibility of balewall construction as a self-build construction technique that could be easily taught and applied. It also involves the development of a funding model in the form of a revolving loan fund.

The initiative has resulted in the creation of a home building and renovation co-operative, completion of a training program in self-building techniques and development of organizational and administrative skills. The pilot project was extended to two communities in northern Manitoba -- Sioux Valley and Lake Manitoba where two homes have been successfully constructed. Two additional homes were scheduled to start construction in Cumberland House in the spring of 1998.

Produced by the World Vision Aboriginal Council. Produced under the auspices of Homegrown Solutions Maison, a grant program funded by Canada Mortgage and Housing Corporation. Homegrown Solutions is a joint initiative of the Canadian Housing and Renewal Association, the Federation of Canadian Municipalities, the Cooperative Housing Federation of Canada; and the Canadian Home Builders' Association. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Autoconstruction de logements en bottes de pailles destinés aux Autochtones : Cumberland House (Saskatchewan).

IMPACT DU BRUIT INDUSTRIEL SUR LES SECTEURS RÉSIDENTIELS ENVIRONNANTS: PORTRAIT DE LA SITUATION POUR LA BEAUCE ET POUR LA RÉGION DE QUÉBEC, ANALYSE DES LOCALISATIONS PROBLÉMATIQUES ET RECOMMANDATIONS

Residential sectors can be adjacent to sectors that are classified as commercial or industrial but, in many cases, the two functions are not compatible, whether on account of intense trucking activity, sporadic noise throughout the day or even continuous noise that can last well into the night. There are many complaints in this regard, in both urban and rural areas. Planners and legislators are generally powerless to resolve this issue. In existing conflict situations, both functions are well within their rights, that is, residents can demand peace and tranquillity, while industrialists can expect to work and operate their companies, without having any new constraints imposed on them. As for potential situations, in the case of new residential developments, for example, there is not always an in-depth environmental analysis, or else, the pressure from developers wins out over the viewpoints of planners and environmentalists.

In this context, the research project proposed to establish the situation regarding the impact of industrial noise using as its laboratory the Québec and Beauce areas, two areas that comprise numerous industrial parks adjacent to residential sectors. The Beauce area, in addition to its very active industries, has a topography that is conducive to the concentration of urbanization and human activities. The principal objectives of the project were as follows:

- establish the scope of the problem of the impact of industrial noise on the closest residential sectors;
- measure and map the noise in the residential sectors deemed the most critical (with special consideration given to industries operating 24 hours a day);
- verify the causes of the situations analyzed (uncontrolled growth of residential developments, poor industrial planning or indifference of the industrial sector);
- identify the provincial and municipal legislative situation;
- analyze the possible mitigating actions (in particular, using computer modelling), such as reducing or controlling the level of noise at the source, or introducing protective measures, which could potentially include landscaping; and, finally,
- compile the results in a regional perspective, for both the survey of the situation and the recommendations.

Among all the industrial zones and parks visited, 15 sites were retained and analyzed in the Beauce area and 27 in the greater Québec area. The research project made it possible to document and clarify an often neglected aspect of residential environment quality and also to propose a few avenues for more sustainable solutions, to the attention of planners, industrialists, municipalities, and even developers.

Prepared by Jean-Gabriel Migneron, Pierre Côté, Wu Weixion. CMHC Project Officer: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

103-05914/

NOISE ISOLATION PROVIDED BY EXTERIOR WALLS IN WOOD CONSTRUCTION

The External Research Program of Canada Mortgage & Housing Corporation accepted the proposal by MJM Acoustical Consultants Inc. to conduct a study on the noise isolation provided by exterior walls in wood construction.

At the time the proposal for this research project was submitted, the acoustical data available on exterior walls was almost non-existent. The main objective of this project was to fill this void by investigating the sound attenuation properties of four exterior walls commonly used in Canadian low cost residential housing. A total of nine Sound Transmission Loss measurements were conducted on the four exterior walls selected: two walls with 38 mm x 140 mm (2" x 6") studs and two with 38 mm x 89 mm (2" x 4") studs. Five tests were carried out on walls with no exterior finishes, and four on walls with PVC cladding. All the wall compositions selected had a thermal insulation factor of RSI 3.5 (R20). In order to establish the effect of varying the stud spacing, one sound transmission loss test was performed on a wall whose studs were spaced 600 mm (24") apart; the rest of the specimens were constructed with studs spaced at 400 mm (16") o.c. which is presently the stud spacing most often used for exterior walls in Canadian construction. The interior finish was the same for all the walls tested: 13 mm (1/2") drywall located on the receiving room side (the large reverberation chamber). The exterior side of the wall was located on the source room side.

Prepared by Michel Morin, MJM Acoustical Consultants Inc. CMHC Project Officer: Ken Ruest. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

SOUND AND FIRE PERFORMANCE OF FIRE STOPS IN MULTI-FAMILY DWELLINGS: FLANKING TRANSMISSION AT JOINTS IN MULTI-FAMILY DWELLINGS: PHASE 1: TRANSMISSION VIA FIRE STOPS

Fire stops can introduce a physical connection between the two sides of a double-stud wall, hence providing structural flanking paths for transmission of vibration which worsens the sound insulation.

This study primarily addressed the specific case of a load-bearing party wall with double wood studs, supporting a floor with wood joists perpendicular to the party wall and a floor deck or sub-floor of 15.9 mm OSB.

Even without structural transmission of vibration through a fire stop, the sound insulation in a real building is normally affected by flanking transmission.

Addition of a fire stop provides yet another path for vibration transmission between the rooms, and hence tends to worsen the sound insulation further. This study examines how a fire stop at the floor/wall junction can degrade the apparent sound insulation of the party wall (the nominal separation) by increasing structural transmission of vibration around that wall via the connected floor system (the flanking path).

Prepared by T.R.T. Nightingale, R.E. Halliwell, Institute for Research in Construction, National Research Council. Prepared for: Canada Mortgage and Housing Corporation ... et al. CMHC Project Officer: Jacques Rousseau. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

BASEMENT WALLS THAT DRY: FINAL PROJECT REPORT

An eighteen month study was undertaken to evaluate the abilities of 10 basement wall insulation/framing options to dry after being subjected to either a controlled leak or a short term flood. Conventional wood framed construction, steel stud construction and three proprietary systems were evaluated. The proprietary systems included a new product from Owens Corning which is a vinyl faced rigid fibreglass system which can be installed without wood or steel framing, an extruded polystyrene insulation system, Perimate from Dow and a sprayed in place polyurethane insulation. Five variations of conventional wood stud framing were evaluated. The differences evaluated ranged from the use of an external moisture barrier to standing the framing off walls and floors to the use of Densglas as an alternative to gypsum board. The two steel stud systems tested varied only in stand off from the basement wall.

In general all of the proprietary wall systems performed better that the wood framed or steel stud systems. The systems either did not absorb significant amounts of moisture or dried relatively rapidly after wetting. This was observed whether the moisture source was a controlled leak or a short term flood.

The steel stud systems performed better than their wood framed counterparts when subjected to a short term flood. The steel studs, having no capability to retain moisture, dried out more quickly than the wood systems.

Of the wood framed systems tested none appeared superior in both cases: controlled leak or flood. In the case of a controlled leak, such as might occur in the event of a crack in a basement wall, the systems that had an external moisture barrier caused the water to flow down the wall, under the bottom plate and into the basement. Because such systems were never really wetted they appeared to offer superior performance. When the source of the moisture was a flood the opposite appeared to be true. It was not possible to "seal" the panels, nor was any real attempt made to do so. When standing in 100 mm of water during a "flood" the liquid found its way into all panels, regardless of whether a moisture barrier was present. Once in the panel the moisture remained longer in panels equipped with a moisture barrier. In other words the moisture barrier inhibited moisture removal.

Aside from some darkening in the bottom plate of two of the wood framed panels the study was unsuccessful in producing significant growth of mold or mildew. Conditions were generally favourable; surface moisture and wood moisture contents in excess of 25% for months but no infestations occurred. This may be due to the lack of spores which must be present to initiate growth.

Prepared by Tom W. Forest and Mark Y. Ackerman. Ottawa: Canada Mortgage and Housing Corporation, 1999.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Séchage des murs de sous-sol.

CRAWL SPACES: HOW TO AVOID MOISTURE AND SOIL GAS PROBLEMS

A crawl space is a type of shallow foundation, usually with the floor at grade and with a low headroom, typically less than 4 feet. Crawl spaces are commonly used in areas where there is a high water table, or where services are shallow (as in milder climate zones). They can also be found where deep excavation is not needed to provide adequate structural support, where the frost line is shallow, or where ground conditions are inappropriate for full in-ground basements - for example where there is considerable bedrock near the surface.

Crawl spaces often do not get adequate inspections and there is a general lack of appreciation by the housing industry for the elements that make up an effective moisture control strategy.

Moisture-related problems occur in many crawl spaces despite the fact that building codes require vents. Crawl space moisture needs to be controlled because it can result in mold growth and decay in the crawl space lumber, if humidity levels are too high. Moisture from the crawl space can also move into the living area, or even into the attic, causing similar problems in these areas.

The connection of crawl space air to the rest of the house can be affected by the choice of heating and cooling systems. With a forced warm air heating system, the crawl space is usually linked to the rest of the house through the leaky ducts placed in the crawl space. This provides plenty of mixing of crawl space air with the rest of the house, so the moisture is dissipated throughout the house. In houses without forced air systems, the house interior is not affected as much, because there is less physical connection between the house and the crawl space. Houses with high levels of air leakiness will move crawl space air into the house regardless of the type of heating system.

Many problems found in crawl spaces are related to a misunderstanding of how crawl spaces work. The insulation, air and vapour barriers are typically not well integrated with the rest of the house. Many crawl spaces are built over an exposed dirt floor, rather than incorporating a ground cover, floor drain and perimeter drainage similar to a properly constructed basement.

Recent research has illustrated alternative crawl space construction techniques. Passive ventilation may often be unnecessary or ineffective. The purpose of this publication is to explain the latest understanding of crawl spaces, and how they should be built to avoid problems.

Prepared by Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Comment éviter les problèmes d'humidité et de gaz souterrains dans les vides sanitaires.

LATERAL BRACING OF FOUNDATION WALLS

At the request of the Alberta Housing Industry Technical Committee (AHITC) this study was initiated to investigate the structural adequacy of typical concrete residential foundation walls to resist lateral earth pressures.

The study objectives were to include a review of the adequacy of current construction practices to resist lateral earth pressures. Both 8'-0" (2.44m) high and 9'-0" (2.74m) high concrete foundation walls were examined subject to four different backfill pressure intensities, and various backfill heights. Then, based on the results of the investigation, the second objective was to develop detailed, generic, practical, and cost effective solutions of lateral bracing details for the top of wall connections, where such details are required. These lateral bracing details were to be applicable to both conventionally framed and wood I-joist floor systems.

Overall the scope of the project was limited to typically constructed, residential concrete foundation walls 8" (200mm) thick by either 8'-0" (2.44m) or 9'-0" (2.74m) high. Maximum sidewall and endwall dimensions of 60'-0" (18.3m) and 30'-0" (9.14m) respectively were assumed. As well, deviations in the wall including short angled walls, beam pockets, areas adjacent to stairwell openings and areas surrounding large windows were studied. Based on the results of the study, a number of interesting points were revealed:

I. The recommended lateral earth pressures are significantly higher than the building code specified minimum value.

II. The nominal strength of the concrete wall is substantial and therefore vertical reinforcement may not be required in many situations; however for high backfills, suggestions for reinforcement are made.

III. The industry standard practice for top of wall connections is in general not adequate to resist the calculated lateral forces. Recommendations for improving this connection are made.

IV. The use of short angled walls and beam pockets to laterally stabilize the wall were found to be neither practical nor effective ways to provide the required support.

V. The effects of window openings in the wall and stairwell openings adjacent to the wall were examined and recommendations for local reinforcement around these areas are provided, as well as lateral bracing requirements each side of such areas.

Prepared by Kelly Grubb, Bearden Engineering Consultants Ltd. CMHC Project Officer: Darrel R. Smith. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

INCREASING THE VOLUME OF USED BUILDING MATERIALS IN CANADIAN CONSTRUCTION: A REPORT TO ASSIST HOMEOWNERS, CONTRACTORS, BUILDING OFFICIALS AND OPERATORS OF USED BUILDING MATERIAL CENTRES IN CANADA

The used building material industry has experienced rapid growth in North America over the last five years. Today, it encompasses private, for profit and private non-profit organizations involved in the reuse and recycle business. This report is based on an industry survey conducted by the Used Building Material Association (UBMA). Its purpose is to explore ways to increase deconstruction activity, specifically where it concerns the reuse of building materials. The report specifically highlights wood and wood-related materials, a type of inventory that appears to have the greatest potential for increased sales and supply. While many of the associations canvassed have recycling services as well, this report focuses on material reuse.

The survey found a number of issues that can influence the viability of the used building material market. Such issues include regulatory barriers, technical barriers, and marketplace barriers. On the positive side, effort is being spent on establishing links within the industry through use of the Internet. Information sources include company listings, government programs, and material exchange opportunities.

Prepared by Bob Sawatsky and Jennifer Corson. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Cate Soroczan. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

THE MACROECONOMIC IMPACT OF THE BUILDING MATERIALS INDUSTRY IN CANADA

Using input-output (I-O) data and a well-known macroeconomics model of the Canadian economy, this study estimates the economic impact of the Canadian building materials industry in terms of national income and employment for the years 1995 and 1989. The study covers sub-industries producing:

- gypsum, wallboard and accessories;
- plumbing fixtures and fittings;
- windows and doors;
- roofing;
- insulation and air barriers;
- heating and air conditioning systems;
- exterior cladding;
- flooring;
- concrete products;
- ready-to-use lumber;
- paints and related products;
- textile floor coverings;
- kitchen cabinets; and
- floor and wall coverings, excluding vinyl.

For each sub-industry, impacts are broken down into:

- direct impacts, occurring within the sub-industry itself;
- indirect impacts, occurring in industries that supply the sub-industry with raw materials and other inputs; and
- induced impacts, generated throughout the economy as households spend income earned as a result of direct and indirect impacts.

Prepared by Geoff Bromfield, Martha Justus, Keith May, Informetrica Limited. Ottawa: Canada Mortgage and Housing Corporation, 1999. (Housing Affordability and Finance Series: Research Report)

Order number: PE0325 (61593)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Répercussions macroéconomiques de l'industrie des matériaux de construction au Canada.

VIRTUAL SAMPLE ROOM WEB SITE OF GREEN BUILDING MATERIALS

The objective of this project was to develop a bilingual web site which will serve as an on-line catalogue/sample room of building materials that provide low environmental impacts. It will serve anyone involved in the selection of the various building materials that go into residential buildings such as architects, builders, renovators, property managers, and homeowners. The site contains pictures of the products, the evaluation matrix, and the manufacturers information. This is a multi-partnered project including Public Works and Government Services Canada, Department of National Defense, Natural Resources Canada, Rural Municipality of Waterloo, and Human Resources Development Canada. The site is relatively small but is expected to grow over the coming months following promotion of the site.

AVAILABILITY: On the Internet at: www.sampleroom.buygreen.com

CANADA MORTGAGE AND HOUSING CORPORATION

CMHC AND YOU: CHALLENGE, INNOVATION, TEAMWORK

The purpose of this 24 page book is to describe what the Canada Mortgage and Housing Corporation (CMHC) is all about, to outline the work opportunities available in its key business fields, and to list the qualities it is looking for when hiring new employees. The book describes the mission, vision, and values of the Corporation and tells of the challenging employment opportunities available to a wide spectrum of professionals in the following core business fields: housing finance; housing research and information transfer; the promotion of Canadian housing exports; and assisted housing.

Ottawa: Canada Mortgage and Housing Corporation, 1998.

Order number: NHA 2152 (60952)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : La SCHL et vous.

SUMMARY OF THE 1998-2002 CORPORATE PLAN = RÉSUMÉ DU PLAN D'ENTREPRISE POUR 1998-2002 and SUMMARY OF THE 1999-2003 CORPRATE PLAN = RÉSUMÉ DU PLAN D'ENTREPRISE POUR 1999-2003

These documents provide a summary of Canada Mortgage and Housing Corporation's (CMHC) Corporate Plan for the Corporation's annual budgets which were approved by the Treasury Board and the Governor in Council. These summaries, a requirement under the *Financial Administration Act (FAA)*, are tabled each year in Parliament.

The Corporate Plan Summary identifies key issues that will impact on CMHC's business directions over five years, the overall objectives for the planning period, the strategies and associated activities that CMHC will use to achieve its objectives, and the performance measures for the strategies. The documents also set out a plan for the financial resources that CMHC will require to carry out federal housing policy for the next five years.

Ottawa: Canada Mortgage and Housing Corporation, 1998-1999. 2 volumes.

AVAILABILITY: Canadian Housing Information Centre

YOUR HOUSING EXPERTS

"Your Housing Experts" is a general-interest publication directed to those interested in an overview of CMHC information products, services and programs.

Ottawa: Canada Mortgage and Housing Corporation, 1998.

Order number: NE2146 (60950)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Les experts en habitation.

CITY PLANNING AND HUMAN SETTLEMENTS

GRANVILLE ISLAND: AN URBAN OASIS

Twenty years ago, Granville Island was transformed from a decrepit 37-acre industrial slum in Vancouver's False Creek to possibly the most successful urban redevelopment ever seen in North America. Rusty tin-sided factories were reborn as a public market, an art school, shops, restaurants, theatres, and a great deal more. Today, Granville Island boasts more than eight million visits a year, 2,600 jobs and the highest sales per square foot of any public market on this continent.

This book chronicles the Granville Island story, celebrates what the Island has to offer, and peers inside its seldom-seen inner life. It describes the Island's heritage, its transformation, attractions and amenities and its working life.

Prepared by Michael McCullough. Vancouver : Granville Island Office, Canada Mortgage and Housing Corporation, 1998.

** Price: $39.95 + GST and handling charges.

AVAILABILITY : Granville Island Office, Canada Mortgage and Housing Corporation

LE PROGRAMME ÉCO-QUARTIER DE LA VILLE DE MONTRÉAL: UNE INNOVATION EN ÉVOLUTION

The Éco-quartier program was organized by the City of Montreal to involve its citizens in locally-based environmental initiatives. The purpose of this report is to evaluate the program so that readers from Montreal and all municipalities across Canada can benefit from lessons learned.

This innovative program responds to local environmental needs, most particularly collecting recyclable materials and greening the city. However, it has not addressed large-scale environmental problems such air pollution. In this regard, it has been more focused on issues that directly affect local citizens. Thus the mandate or scope has been somewhat limited.

Regarding its greening the city activities, a horticultural approach has been favoured over an ecological approach, i.e. beautification over biodiversification. Interviews reveal that participation in the activities by citizens has been weak on the design and maintenance of the planted sites, but that local citizens enjoy the initiatives and feel that they fill a social need.

To improve the program, the organizers should involve residents in all phases of the projects, favour use of public spaces over private lots, and make better use of partnerships. They should also expand the program to address other local environmental issues.

Prepared by Gilles Sénécal and Diane Saint-Laurent with the collaboration of Anne-Marie Charlebois and Daniel Léonard. CMHC Project Officer: Susan Fisher. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

CONCRETE

ANTI-CARBONATION COATINGS FOR USE ON CANADIAN BUILDINGS

Carbonation is a process that reduces the natural alkalinity of concrete. Cement hydrates in the concrete react with carbon dioxide, from the atmosphere, to produce calcium carbonates. Advanced carbonation can induce corrosion of the reinforcing steel in a reinforced concrete structure which can in turn lead to fracture formation in concrete and structural distress.

Coatings and sealers have been found to slow or prevent the progress of carbonation in European laboratory tests. This field study initiated testing of certain coatings/sealers to determine their effect on the rate of carbonation. The products to be tested were selected on the basis of technical data made available by the suppliers. The criteria for suitable products were carbon dioxide resistance, water vapour permeance, and water resistance.

Five years after the application of the anti-carbonation coatings, the depth of carbonation increased by about 5.5mm in the control areas that were not provided with any form of protection. The depth of carbonation in each coated area progressed by an average of about 3.5mm, with the exception of one coating which provided no apparent protection against carbonation.

The results indicate that none of the coatings evaluated in this study were able to totally arrest the progression of carbonation. Three out of the four tested coatings partially retarded the rate of carbonation. One of the coatings did not have any measurable effect on the carbonation rate. The most effective coating, a siloxane primer with a methacrylate topcoat, reduced the carbonation rate by approximately 50%.

Prepared by Halsall Associates Limited. Principal Consultant: Peter Halsall. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: Cate Soroczan. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Revêtements anti-carbonatation appliqués aux bâtiments canadiens.

CONTAMINATED LANDS

RISK ASSESSMENT PROCEDURES FOR HOUSING ON CONTAMINATED LANDS

Two projects researched methods of performing risk assessments for houses on or near contaminated lands. The first project compared the risk assessment procedures currently in use by nine contractors and the risk assessments generated by the contractors when they are all presented with the same hypothetical case. The risk assessment was a screening level, as opposed to a detailed assessment. The variation in risk assessments from one firm to another was several orders of magnitude. The report reveals the causes of these significant variations. There is a main report and a shorter summary report available from CMHC.

The second project assembled housing factors that can be useful in calculating these risks and presents them in a manner that is easy for site assessors to use. Copies of this guide, Estimating the Concentrations of Soil Gas Pollutants in Housing, are also available from CMHC.

AVAILABILITY: Canadian Housing Information Centre

CONTAMINATED LANDS

URBAN BROWNFIELDS: CASE STUDIES FOR SUSTAINABLE ECONOMIC DEVELOPMENT: THE CANADIAN EXAMPLE

This paper is part of the contribution of CMHC to an ongoing collaborative initiative of the Organization for Economic Cooperation and Development (OECD), the United States Environmental Protection Agency (U.S. EPA), and the International City and County Managers Association (ICMA). The report provides information on the current Canadian situation regarding legal and administrative frameworks, players in the process of developing contaminated sites, recent case studies, and suggested best practices that might be employed in other jurisdictions.

Challenges to development on contaminated sites are grouped into six issue groups: regulatory, technical/scientific, legal/liability, financial, urban planning, and communications. By far the most prominent issue is the desire of all participants in the development process to reduce or eliminate their exposure to liability to pay for site cleanup or the effects of contamination. A significant issue is the added time and expense that is required to develop contaminated sites that may result from approval processes, and regulations which call for unnecessary or unrealistic cleanup activities. The inability to gain financing and insurance for redevelopment projects is a significant barrier. There are opportunities for a better integration of land use planning and site remediation disciplines and their respective approval processes. Methods to better communicate the issues surrounding contaminated sites are needed to reduce fears and misconceptions among process participants and observers alike.

To address the many issues common to redeveloping contaminated sites, twenty-two best practices are suggested. The single most important best practice is the risk assessment/risk management (RA/RM) approach. This method evaluates the actual human or environmental risk, considering the nature of contaminants in relation to the sensitivity of receptors and the exposure pathways, and is favoured by many practitioners.

Prepared by Delcan Corporation, Golder Associates Ltd., and McCarthy-Tétrault. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: David D'Amour. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

COOPERATIVE AND NON-PROFIT HOUSING

BUILDING A MODEL FOR AFFORDABLE HOME OWNERSHIP: NEW DAWN ENTERPRISES: DOCUMENTATION AND ANALYSIS OF TWO ASSISTED MINI-HOME OWNERSHIP PROJECTS

New Dawn, a not-for-profit community development corporation, prepared two case studies to determine whether manufactured housing would be one way to provide affordable homeownership for low-income households and those on social assistance. The people involved participated in the planning and development of collectively-owned mobile home parks. The two cases used existing properties in the community. One case rehabilitated a deteriorated privately-owned trailer park; the other developed a former military base.

In one case, the development was facilitated by a community worker from the provincial government and in the other by New Dawn itself. Both included education and training components, through which it was expected that participants would gain new skills, increased self-esteem and a stronger sense of community.

Together, the two initiatives added thirty-six new manufactured homes and rehabilitated or created two manufactured-home parks.

The cases show that manufactured homes can provide an affordable option. However, important lessons were also learned about providing housing when the homeowners are dependent on social assistance. The Oceanside project has experienced a high level of default due to the inability of households on fixed social assistance incomes to meet unexpected or rising costs.

The collective self-help approach did generate benefits in terms of developing personal and organizational skills, strengthening the community and enabling bulk purchase. Better budgeting and a pre-purchase counselling process would be desirable in any future initiatives of this sort. The manufactured home provides a good quality home at a relatively affordable price and subject to municipal regulation of mobile home parks may be easily transferable to other communities.

Submitted to Homegrown Solutions. Submitted by New Dawn Enterprises Limited. Ottawa: Canada Mortgage and Housing Corporation, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : L'élaboration d'un modèle abordable d'accession à la propriété d'un logement.

L'HABILITATION (EMPOWERMENT) DANS LES ORGANISATIONS COOPÉRATIVES: CINQ CAS DE GESTION DE COOPÉRATIVES D'HABITATION

People who otherwise never acquire the authority of an entrepreneur are afforded this opportunity in cooperatives. This form of collective entrepreneurship, however, does raise the question of how members actually partake in the activities of the cooperative and what authority they have within the organization. This research deals with the process of integrating and empowering members to take over the reins of their rental housing cooperatives. During the project performance phase, the founding members went through a number of experiences which enabled them to acquire the knowledge, skills and abilities to manage their cooperatives. The renewal of human resources in these types of organizations not only raises the issue of the training they can receive from the outside (cooperative network, groups of technical resources, etc.), but also the renewal of cooperative management practices in house, in particular, the renewal of experiences to foster the integration and empowerment of members with respect to the takeover of their organization.

The report is in two parts. The first part provides an analytical framework of participative management practices in rental housing cooperatives with emphasis on empowering members regarding the takeover of their organization. The second part contains five management cases based on real-life experiences in housing cooperatives. The report also includes a methodology and a bibliography.

Prepared by Marie J. Bouchard and Marc Gagnon. CMHC Project Officer: Michel Brûlé. Ottawa: Canada Mortgage and Housing Corporation, 1998 (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

A HOUSING COOPERATIVE FOR SELF-EMPLOYED WORKERS: FINAL REPORT.

This study reports on an initiative which explored the potential of a housing development that would include independent working spaces and communal office facilities. Individuals operating a small business out of their homes often experience a sense of isolation; at the same time, working from home creates pressures on both the living space and family life. For small independent workers, commercial space is generally quite expensive, and for many, costs may be prohibitive.

The initiative to date has involved two phases: first, information was collected on the needs of the self-employed population and focus groups were organized to develop specific design features for an actual project; second, an investigation was undertaken of the potential financing and some specific sites.

The group suggested 25 housing units as the ideal size. The commercial space would be owned on an equity co-op basis. It would include private offices, meeting areas, a kitchenette, a washroom and a service area for a photocopier and other shared facilities. The preferred location is the Plateau Mont-Royal district, which is central and close to specialized services. Also, this location has the most significant concentration of independent workers in the Montreal area.

The group has not yet been successful in securing a site. Unable to acquire either of two initial possibilities, a school and an industrial building, the search continues, focusing on properties coming on the market which would be appropriate candidates for conversion.

The proponents have to compete with the private market for the purchase of a building while land prices rise in the chosen district. They have sought the support of neighbourhood residents and also gained the support of a new organization, the Regroupement des travailleurs indépendents du Plateau Mont-Royal.

As the project might also qualify for a Quebec program for central neighbourhood revitalization, the proponents have sought the help of the Société d'habitation du Québec in financing the common elements. They have been invited to submit a detailed proposal under an experimental project. Once a building has been found, they intend to explore, with the Canadian Centre for Public-Private Partnerships in Housing in CMHC, how self-employed workers could qualify for a mortgage.

Prepared for the Homegrown Solutions Program. Coordinator: François Cadotte of FC Recherche; Associate: Jocelyn Duff of Habitat sur mesure. Ottawa: Canada Mortgage and Housing Corporation, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Une coopérative d'habitation pour travailleurs autonomes.

NEW BEGINNINGS HOUSING COOPERATIVE: HOME OWNERSHIP MADE EASIER

This study reports on an initiative which allows low-income households to own their own homes at costs below that of renting. The idea came from a local realtor who brought it to the City of Prince Albert. The city then drew on other community representatives and provincial agencies in a true partnership.

Benefiting from the relatively lower price of housing in Prince Albert, the initiative has developed a program *Home Ownership Made Easier (HOME)* to acquire and renovate existing homes. An advisory group of community partners helped low-income households form a cooperative which oversees the purchase and renovation of the homes and holds the mortgage until it is repaid over a 10-year period. At this point, the occupant receives title. The cooperative members participate in providing sweat equity toward the down payment. The province and city have also provided some financial assistance to help meet the down payment.

Since its inception in early 1997 the cooperative has assisted 14 households to acquire and renovate homes for less than $40,000 and valued at approximately $53,000 after renovation. The typical monthly cost is under $350/month. Their aim is to assist 20 households in this pilot phase. The initiative provides a supportive process to help individuals develop financial and ownership skills to move to home ownership. Through the renovation process it has helped to upgrade the existing housing in the city.

Documentation and analysis submitted to: Homegrown Solutions. Submitted by: The New Beginnings Housing Cooperative. Ottawa: Canada Mortgage and Housing Corporation, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : La coopérative d'habitation New Beginnings.

SOUTHWEST SITE OF LA PETITE PATRIE SEEKING COLLECTIVE SOLUTIONS FOR BETTER HOUSING IN LA PETITE PATRIE : FINAL REPORT

This report describes the work of *Partenaires logement* to acquire an affordable housing portfolio of approximately 140 units in the "Southwest Site" of La Petite Patrie. The "Southwest Site" project is in a neighbourhood where the built environment and the residents' quality of life has severely deteriorated.

Partenaires logement have developed a two-pronged intervention strategy: regenerate the Southwest area of the neighbourhood based on formative housing cooperative and NP0 projects; and ensure that the resident population will benefit directly and on a priority basis from revitalization activities. To this end, *Partenaires logement* have set themselves two objectives:

- improve the built environment and resident's living environment; and
- increase the affordable housing supply.

The approach developed to reach these objectives involves community, financial, institutional and political stakeholders in la Petite Patrie. It is designed to mobilize all of these players in the creation of financial levers specifically dedicated to the development of social housing.

Submitted to Homegrown Solutions Maison. Ottawa: Canada Mortgage and Housing Corporation, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Chantier sud-ouest de la Petite Patrie.

BUILDING A SAFER SOCIETY: CRIME PREVENTION IN RESIDENTIAL ENVIRONMENTS

This review of the research relating to the effectiveness of crime prevention in residential environments shows that communities can reduce crime if they do a good job of planning, implementing and evaluating their programs. The report looks at individual responses to crime (property marking programs), community responses (neighbourhood watch, safety audits), Crime Prevention Through Environmental Design (target hardening, defensible space), and crime prevention in high crime neighbourhoods.

Prepared by Rick Linden and Prairie Research Associates Inc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Brenda Baxter. Ottawa: CMHC, 1997.

Order number : PE0288.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Pour une société plus sûre : la prévention du crime dans les milieux résidentiels.

PUBLIC INITIATIVES IN HOUSING: THEIR CONTRIBUTION TO SECURITY IMPROVEMENT AND CRIME PREVENTION: THE CASE OF MONTREAL NEIGHBOURHOODS

The main purpose of this study was to examine to what extent public initiatives in housing can help to improve security and prevent crime in Montreal neighbourhoods. The different neighbourhoods selected were; Côte-des-Neiges, Petite-Patrie and Saint-Michel.

The three neighbourhoods included examples of all public initiatives in housing carried out under various housing programs between 1989 and 1996: the acquisition/renovation program of the Office municipal d'habitation du Montréal (OMHM - Montreal Municipal Housing Board), the Rental Building Renovation Program (RBRP), the Private Non-Profit Housing Program (PNHP), the Index-Linked Mortgage (ILM) Co-operative Housing Program, and the Rental Housing Acquisition Program (RHAP). These initiatives, all of which included renovations, covered a wide range of buildings featuring various types of building management: housing co-operatives, low-income housing (LIH), buildings managed by non-profit organizations (NPOs), and privately-owned rental buildings.

The study was principally based on a survey administered to three groups of respondents (totalling 1,006 persons) in each of the selected neighbourhoods: residents in buildings targeted by a housing initiative (*residents in initiative zones*), their *neighbours* and residents in zones unaffected by these housing initiatives (*respondents in control zones).*

The results of the study show that the renovations help to improve the condition of the dwellings and the security devices in rental buildings. But beyond these physical measures, the type of management in buildings affected by public initiatives in housing has a greater influence on residents' sense of responsibility of building maintenance and on informal social control, and are most often found in housing co-operatives. Physical measures do not seem to be enough: one must also look at the internal organization of tenants within buildings. The differences between the three neighbourhoods also underscore the need to take the particularities of each community into account. The findings accentuate the importance of assessing problems on a neighbourhood level and the need for a comprehensive approach in analyzing the factors that contribute to crime and fear of crime, and in implementing initiatives targeting these problems.

CRIME PREVENTION

Prepared by: the Société de développement de Montréal (formerly the Société d'habitation et de développement de Montréal). Prepared for: Canada Mortgage and Housing Corporation and the Société d'habitation du Québec. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Interventions publiques en habitation : leur rôle dans l'amélioration de la sécurité et la prévention de la criminalité : l'expérience des quartiers Montréalais.

VOICES FOR SAFE NEIGHBOURHOODS

This do-it-yourself guide for coordinating safety audits in residential neighbourhoods will help a community work together to perform a safety audit. It integrates the knowledge of experts and the experience of residents and others who have been through the process. It shows what can be done to identify threats to safety and security and to create a safer neighbourhood.

Prepared by Rural and Small Town Programme, Mount Allison University. Funded by Canada Mortgage and Housing Corporation and the Royal Canadian Mounted Police. Ottawa: CMHC, 1998.

Order number : PE0297 (61579)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Des voix pour la sécurité des quartiers.

DOORS & WINDOWS

RETROFIT AND REMEDIAL WORK ON EXISTING SLIDING DOORS AND WINDOWS

Aluminum sliding windows and doors help clad a significant proportion of the residential building stock in Canada. Since their appearance on the market in the 1950's, they gained in popularity and use due to their relative low cost, simple installation, and ease of maintenance. Deterioration of the original weatherstripping results in assemblies with poor air leakage performance and other incidental anomalies. Nationwide replacement of these windows and doors with more energy efficient models is a difficult and expensive undertaking.

It was the purpose of this study to analyse the alternatives which can be used to upgrade these windows rather than to completely replace them. By simply changing or replacing certain components, it was found that significant improvements could be achieved to the air leakage resistance of these units. Most of these upgrades, such as changing deteriorated weatherstripping gaskets with more efficient models, are relatively simple tasks which could be carried out by a building superintendent with some special training. The modified or upgraded doors and windows could thus obtain air leakage performance comparable to new windows on the market today. The costs associated with the implementation of such modifications are considerably less than those expected for complete replacement.

DOORS & WINDOWS

Prepared by: Jozef Zorko, Desnoyers Mercure Inc. and Dominic Chiovitti, Patenaude Chiovitti Inc. CMHC Project Officer: Ken Ruest. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

ENERGY CONSERVATION

ENERGY PERFORMANCE CONTRACTING IN MULTI-UNIT RESIDENTIAL BUILDINGS: FINAL REPORT

Energy Performance Contracting, EPC, is a unique business arrangement under which an Energy Service Company, ESCO, provides a turnkey service to finance building renewal projects from utility and operating cost savings. The ESCO provides energy analysis, engineering, construction, financing, operator training and building maintenance services to design and implement energy efficiency projects in existing building facilities. In Canada, ESCOs have completed approximately $1 billion of projects since the early 1980's. The majority of projects have been in the institutional markets where energy use is relatively high, building ownership is stable, and third party lenders enjoy low credit risk customers.

A federal government sponsored survey of the EPC industry for 1994 reveals that of the approximately $200 million of projects initiated in that year, rental apartments and condominiums accounted for only 2.4% or $4.8 million of project value. This substantiates the general observation that EPC has yet to be fully exploited in the multi-unit residential sector.

The purpose of this project is to validate the effectiveness of EPC in the multi-unit residential sector. Five areas have been addressed: case studies of actual projects; best practices for procurement through to project financing; the U.S. experience; a review of current legislation; and policy and program recommendations. Twenty case studies of the application of EPC or EPC related projects have been documented. They indicate a growing interest by certain ESCOs in this relatively untapped market, describe the scope of measures typically implemented, financial arrangements entered into and the magnitude of the cost savings that have been achieved. Best practices and guidelines have been developed for building owners and operators for procurement, selection of energy efficiency measures, training, documentation, project financing, maintenance and utility analyses and monitoring. Sample procurement and contractual documents have been provided.

Prepared by Alan W. Levy Consulting. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Wayne Webster. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

MÉTHODE D'ESTIMATION ÉNERGÉTIQUE DES BÂTIMENTS D'HABITATION BASÉE SUR L'APPLICATION DE L'INTELLIGENCE ARTIFICIELLE

The objective of this project was to develop a rapid method of estimating energy use in highrise residential buildings, by the application of artificial intelligence. The method gives a variety of results, such as total energy consumption, power load, heat and cooling consumption, and takes into consideration such variables as apartment orientation, occupancy schedules, and the interaction of HVAC and envelope systems.

The work consisted of:

- Creation of data bases which classify the parameters of the energy simulations, modeling and validation of the results using DOE-2;
- Application of neural networks including training and validation of the results;
- Development of the simulation for residential buildings; and
- validation of the simulation program.

The program at this stage has been developed for climatic conditions similar to Ottawa, which will be expanded at a later stage. It was tested to verify its accuracy using a previously monitored Ottawa highrise. It provides the total building energy consumption as well as the use by apartments, corridors and parking, with the power loads. The data entry and results interfaces can be modified as well. The program was developed using the MatLab environment: for a larger application, the program would need to be translated into C++ language.

Prepared by Stanislaw Kajl and Marc-Antoine Roberge. CMHC Project Manager: Sandra Marshall. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

AVAILABILITY : Canadian Housing Information Centre

FIRES & FIRE PREVENTION

COSTS AND BENEFITS TO MUNICIPALITIES OF MANDATORY RESIDENTIAL FIRE SPRINKLERS: SUMMARY REPORT

This report presents the results of a study to assess, from an economic perspective, the costs and benefits to municipalities of the mandatory installation of fire sprinklers in all new residential construction. The study was commissioned by Canada Mortgage and Housing Corporation (CMHC), with the participation of the Ontario Ministry of Municipal Affairs and Housing, and the Office of the Ontario Fire Marshal. The National Research Council and Federation of Canadian Municipalities were also involved in the project. In Phase 1, the economic model was developed and tested using data collected from two Ontario case study municipalities, Barrie and Burlington. Subsequently, in Phase 2, revisions to the method and economic model were made and four additional case studies were carried out. The Phase 2 case study municipalities were Edmonton, Alberta; Pitt Meadows, British Columbia; Gatineau, Quebec; and Kawacatoose First Nation, Saskatchewan.

The study examines the benefits and costs of automatic sprinklers and estimates the effect of mandatory sprinklers on the cost of providing municipal fire protection services. The study also identifies the impact of sprinklers on the cost of housing development, construction and maintenance. Municipal costs, such as potential changes in municipal infrastructure, municipal insurance premiums and fire department facilities and operations, have been considered. Development costs, such as the direct provision of infrastructure or the payment of development charges, are examined. Direct construction costs, such as the installation of the sprinkler system, and ongoing operating and maintenance costs for the homeowner, are also identified.

Prepared by: Arencon Inc. with the assistance of Clayton Research Associates Limited, Graham Harmsworth Lai & Associates Ltd., and J.G. Henderson & Associates. CMHC Project Managers: Tom Kerwin, Mark Holzman, Nicole Parent. Ottawa: Canada Mortgage and Housing Corporation, 1999, c1998. (Housing Affordability and Finance Series Research Report)

Order number: PE0314 (61589)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : L'installation obligatoire d'extincteurs automatiques à eau dans les habitations.

FIRE RESISTANCE TESTS ON FULL-SCALE FLOOR ASSEMBLIES

This report presents the results of 32 standard fire resistance tests conducted on full-scale floor assemblies as part of the collaborative industry-government research program investigating the effects on the fire resistance of lightweight floor assemblies of subfloor material, gypsum board screw spacing from board edges, wood-I-joist type, method of fastening the gypsum board butt ends, insulation type, number of gypsum board layers, joist spacing, resilient channel spacing, addition of concrete topping, steel/concrete composite systems and structural load.

Prepared by: M.A. Sultan, Y.P.Seguin, P.Leroux, Institute for Research in Construction, National Research Council. Prepared for Boise Cascade Corporation, Canada Mortgage and Housing Corporation, Canadian Home Builders' Association ... et al. CMHC Project Officer: Jacques Rousseau. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

IMPACT ON LIFE RISK OF MANDATORY SPRINKLERS IN RESIDENTIAL BUILDINGS

The fire risk assessment model, developed by the National Research Council of Canada (NRC), was used to assess whether an apartment building with sprinkler protection but with increased fire department response time provides a level of fire safety for the occupants equivalent to that in a building without sprinkler protection but with the current fire department response time. The NRC model is called FiRECAM™ (Fire Risk Evaluation and Cost Assessment Model). The model assesses the expected risk to life and the fire costs in a building based on the dynamic interaction of fire and smoke spread, occupant evacuation and fire department response.

In this study, a 3-storey apartment building is used as a representative building in a new development area of a municipality, where buildings may range from a single family house to a medium-rise apartment building. The expected risk to life to the occupants is assessed with and without added sprinkler protection and with two levels of fire department response: with and without new fire stations.

New development areas in five cities are used in this study. They are Barrie and Burlington in Ontario; Pitt Meadows, B.C.; Edmonton, Alberta; and Gatineau, Quebec. In each municipality, the response times of the fire department are calculated using existing fire stations and added new stations. Future stations were previously determined by the municipal fire departments to meet protection needs for projected populations. In addition, the impact of mandatory sprinklers in an existing First Nations Community, Kawacatoose in Saskatchewan, is also assessed.

The results of this study show that, using a 3-storey apartment building as a model building, the provision of sprinkler protection and a longer than normal fire department response time (i.e. no new fire stations) provides a level of fire safety better than the case without sprinkler protection but with a normal fire department response time (i.e. with new fire stations). Based on similarity considerations in fire and smoke spread and occupant evacuation between single family houses and apartment buildings, the impacts of mandatory sprinklers on the expected risk to life, obtained for 3-storey apartment buildings, are argued to be applicable to single family houses.

Prepared by D. Yung, G.V. Hadjisophocleous, N. Benichou and Q. Liu. Prepared for Canada Mortgage and Housing Corporation. Ottawa: Institute for Research in Construction, National Research Council Canada, 1999.

AVAILABILITY: Institute for Research in Construction
National Research Council Canada
500 Montreal Road
Ottawa, Ontario
K1A 0R6

IT COULD NEVER HAPPEN TO ME, HIGH RISE FIRE SAFETY KIT

This high rise fire safety kit consists of a videotape training program for use within the fire service; a videotape targeted to the general public; and public service announcements for radio and television promotion. Appropriate safety messages include proper evacuation procedures, the importance of insurance coverage, and residential prevention measures, such as smoke alarms, fire extinguishers and a family escape plan. This information is applicable to all people who live in high-rise buildings, but also to persons who visit or stay in high rise buildings for short periods of time, such as in hotels. CMHC was a partner in the development of these materials as part of a national high-rise fire safety education campaign.

AVAILABILITY: Carleton Productions International
P.O. Box 5069, Merivale Depot
500 Merivale Road, 5th Floor
Ottawa, Ontario
K2C 3H3
Phone: (613) 224-9666

FIRES & FIRE PREVENTION

SOUND AND FIRE PERFORMANCE OF FIRE STOPS IN MULTI-FAMILY DWELLINGS: FIRE SPREAD IN WALL-FLOOR JOINTS OF MULTI-FAMILY DWELLINGS

This report presents the results of 3 full-scale tests conducted at the Institute for Research in Construction, National Research Council of Canada on double stud party wall/floor joints. The assemblies were tested in a floor furnace using the CAN/ULC-S101-M89 temperature-time relationship. This study was part of a joint research project on the fire and sound flanking at the wall/floor joints in double stud wall assemblies.

Assemblies No. 1 and No. 2 were tested with various fire stop materials: semi-rigid glass and rock fibre insulation boards, sheet steel and Oriented Strand Board (OSB) placed between the joist headers, to investigate whether these materials will prevent flame spread into the upper storey cavity between studs for 15 min. Assembly No. 3 was tested, with no fire stop material in the space between the joist headers, to investigate the effect of the width of the vertical air space (12.7 mm, 25.4 mm and 38.1mm) between insulated double-stud frames on flame spread to the upper storey cavity between studs.

Prepared by: M.A. Sultan, Y.P.Seguin, P.Leroux, Institute for Research in Construction, National Research Council. Prepared for Canada Mortgage and Housing Corporation ... et al. CMHC Project Officer: Jacques Rousseau. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

FLOODS

THE JULY 1996 SAGUENAY DISASTER: IMPACTS OF REDEFINING THE HABITAT

The intent of this research is to allow one to appreciate, based on a target population in the Saguenay region, the consequences of a natural disaster in the design of one's home and the role this plays in the various stages disaster victims go through when they are required to relocate involuntarily. In more specific terms, this research attempts to answer the following questions:

- What were the residential itineraries of families which were uprooted against their will as a result of the floods of July 1996?
- What modifications did those who were involuntarily located make to their homes?
- What mechanisms did these people resort to in order to integrate into their new communities?
- What decision-making strategies could be used to take into account the needs and the living experience of relocated persons?

The research strategy takes a qualitative approach which involves interviews with about forty persons or couples who lost their homes and all their personal possessions during the floods of July 1996. Two verification instruments are used to explain what has been observed - semi-directed interviews and fact sheets. The answers to the questions asked produced the following findings. In addition to the physical and psychological effects of the direct consequences of the disaster and the numerous related difficulties, several aspects of the victims' personal, family, professional and social lives changed:

a. residential itineraries (most victims relocated three or four times before taking up their current residence) were a source of major tension;

b. integration into new neighbourhoods was mainly achieved with the participation of family and friends, and the new neighbours were often left out of the process. According to the disaster victims, living in a new neighbourhood means a break or even mourning, e.g. "A separation from friends, the loss of a feeling of security, changes in lifestyle, financial constraints, etc.;

c. the loss of "this paradise (...) this great corner of the world" elicits a new definition of the housing which is marked by images or representations that are negative (feeling of strangeness, nostalgia, indebtedness, sentimental losses, etc.);

d. finally, disaster victims have some suggestions to pass on to others who suffer a similar fate to inform and guide them.

They suggest that victims take a step back before they make any important decisions. If volunteers are required at all times to display an understanding and generous attitude, the various levels of government should reduce bureaucratic and administrative requirements. Another suggestion offered by disaster victims was to extend the period during which financial and psychological help would be provided.

Prepared by Danielle Maltais, Suzie Robichaud. CMHC Project Officer: Marcel Boily. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Le Sinistre de juillet 1996 au Saguenay.

HEATING & VENTILATION

APPAREILS DE COMBUSTION DE BOIS ET QUALITÉ DE L'AIR INTÉRIEUR

From an economic standpoint, wood heating represents an alternative for Canadians. A number of people, however, are concerned about the potential deterioration of the ambient air quality in homes equipped with wood-burning appliances. The authors conducted a survey in the Quebec area to verify the significance of contamination from formaldehyde (HCHO), nitrogen dioxide (NO_2), breathable particles (PM10s) and carbon monoxide (CO) in houses with wood-burning appliances. In addition, they examined respiratory illnesses and symptoms among residents of homes heated partially or totally with wood.

A total of 89 adults and children took part in the study, with 1 adult and 1 child per residence. Among the homes, 59 were equipped with wood-burning appliances, and 30 were heated exclusively with electricity. Samples of HCHO, NO_2, PM10s and CO were taken in 49 houses (41 with a wood-burning appliance, 8 with no source of combustion products) for periods of 12 (CO) or 24 hours. Temperature and humidity readings were also taken. The respiratory symptoms of the participants (adults and children) were documented using a daily diary of symptoms. Data was also collected on home characteristics that were likely to deteriorate air quality.

In general, the contaminant concentrations measured were low for both houses with or without wood-burning appliances. In fact, and only for PM10s, 3 homes equipped with a wood heating appliance had contaminant levels higher than those recommended by Health Canada or the Environmental Protection Agency (EPA) respectively for indoor and outdoor air. Of these 3 homes, 2 had reasons other than the presence of a wood stove to explain the documented values. Still, the results, but especially the documented literature, showed that wood-burning appliances were likely to generate CO or PM10s.

Among the home variables most associated with the proportions of participants or the number of days of respiratory symptoms felt by the children or adults, the presence of animals or mould and a low frequency of open windows were documented. Residents living in homes with wood-burning appliances that had sustained combustion spillage, declared more respiratory illnesses and symptoms than those residing in houses either with a wood heating appliance with no spillage or else with no source of combustion products. There was no significant difference between the occupants of the last two housing categories.

The residents of homes equipped with wood-burning appliances should, just as all those living in residences with heating appliances likely to generate combustion products (regardless of the combustible), equip themselves with CO detectors. As well, in houses with wood-burning appliances, the presence of combustion spillage appears to be associated with an increase in respiratory illnesses and symptoms. A properly working, well installed, carefully maintained and adequately used appliance probably constitutes the best guarantee not only against fire and safety hazards, but also against the deterioration of indoor air quality and, consequently, the respiratory health of the occupants.

Prepared by Benoît Lévesque ... et al. CMHC Project Manager: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 1997. (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

CARPET STREAKING. ABOUT YOUR HOUSE; CE14

Carpet streaking is permanent, dark staining near baseboards, air registers, under doorways, and in other areas where moving air may filter through rug fibres. What causes it, how to avoid it and what to do if you have it, are all covered in this handy fact sheet.

May be of interest to homeowners, builders and renovators, carpet retailers, carpet cleaners, property managers, building inspectors, etc.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: 62035

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Tâches en traînée sur les moquettes.

EVALUATION OF RESIDENTIAL FURNACE FILTERS

Forced air furnaces are a common Canadian heating system. Traditionally, filters placed in the circulating air ductwork were designed to protect the furnace and fans. Over the last several years, there has been increased emphasis on improving the filtration efficiency with the goal of reducing occupant exposure to respirable particulate.

This project tested the performance of different filters in actual houses, from disposable fiberglass to electrostatic precipitators. The contractor looked at how air filtration affects the levels of particulates (airborne dust) in housing, and at the production of ozone by electrostatic precipitators.

Analysis shows that good filters do remove particulates at rates that are close to their rated performance. For example, the most effective filter tested, an electrostatic precipitator, reduced the quantity of particulate in the air in the duct from 70% - 90 % in different tests. But, because particulate is constantly infiltrating the house and is being created by occupant activities, the tests showed that when this very good filter was in operation, the concentration of airborne particulate in the house air was reduced only 40%. All other filters tested, being less efficient, fell in the range of less than 40% reduction. As well, these filters only work when the furnace fan is on. If the fan is not run continuously, installing good filtration will be even less effective.

A more comprehensive dust-reduction program is necessary (e.g. reducing house air leakage, better and more frequent vacuuming, reducing house particulate sources, etc.) to make a significant reduction in house airborne particulate, rather than simply increasing furnace filter efficiency. Upgrading filters is only a partial solution.

Prepared by Dara Bowser, Bowser Technical Inc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Don Fugler. CMHC, 1999. (Housing Technology Series)

Order number: PE0343 (61607)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Évaluation des filtres pour générateurs d'air chaud résidentiels

FIELD SURVEY OF HEAT RECOVERY VENTILATION SYSTEMS

Ventilation is one of the most important design issues of the 90's in the Canadian construction industry. Building codes promote the comfort and safety of occupants by ensuring fresh air is provided to new homes, and stale, contaminated air is exhausted outdoors. Increasingly, these code requirements are being satisfied by the use of packaged heat recovery ventilators (HRVs).

Given the increased reliance on HRVs for ventilation, several authorities expressed a desire to explore and assess the relationships between home design, mechanical ventilation system design, installation practices and occupant use of ventilation systems as they relate to the effectiveness of ventilation of the dwelling. In response to such concerns, Canada Mortgage and Housing Corporation engaged Buchan, Lawton, Parent Ltd to study the field performance of HRV ventilation systems.

The conclusions drawn from these results will make it possible to improve installation practices, HRV system performance, and occupant understanding of and interaction with their HRV system.

The project involved four phases: 1) inspections of 60 homes with HRV ventilation systems, 2) survey of the occupants of the 60 households to determine their understanding and usage of their HRV ventilation systems and a telephone survey of a further 15 households, 3) intensive performance testing of existing HRV ventilation systems, and 4) intensive performance testing of experimental HRV ventilation systems.

The methodology for Phases III and IV involved the use of a trace concentration of gas to assess air change rates. Sulphur Hexafluoride, an innocuous gas not found in household environments, was released at predetermined points throughout the house and mixed by mechanical means until similar concentrations were achieved throughout the house. By measuring the decay in the concentration of the gas, the apparent air change rates were derived. The operating conditions of the ventilation system and the locations of the sampling points had an impact on the extent to which the measurements reflected whole house ventilation rates, room-by-room ventilation rates, natural air change rates caused by forces other than mechanical ventilation systems, or other factors related to ventilation, such as short circuiting within rooms, and cross contamination.

The common types of HRV installations investigated under this study (fully ducted, simplified and extended) were capable of performing well. The majority of the HRV ventilation systems were operating and were perceived to be providing a benefit to the occupants of the houses. Far greater benefits were possible, however, and considerable improvements could be made in installation practice, system performance, occupant understanding and occupant interaction with their system.

Prepared by Buchan, Lawton, Parent Ltd (Toronto & Ottawa) and Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

FIELD TESTING TO CHARACTERIZE SUITE VENTILATION IN RECENTLY CONSTRUCTED MID- AND HIGH-RISE RESIDENTIAL BUILDINGS

This report provides a snapshot of suite ventilation in recently constructed mid- and high-rise residential buildings in Canada. The purpose of this study was to clarify if current code requirements and HVAC design practices are ensuring that suites are being properly ventilated under typical operating conditions.

This study examined one suite in each of ten buildings that are located in major cities across Canada. Field performance tests showed suite ventilation to be highly influenced by weather, location within the building, and treatment of both interior and corridor access doors. As a result, ventilation within a suite at any given time is very difficult to predict. Furthermore, for all intents and purposes, ventilation in these buildings is uncontrolled.

The greatest concern raised by this study is the amount of transfer air that is part of ventilation air in the suites tested. Large amounts of transfer air from other occupied suites in the building may compromise the quality of ventilation air entering suites. Although not part of this study, large amounts of transfer air during a fire emergency may also increase the danger to occupants as fire and smoke spread within the building.

To ensure suite ventilation is both controlled and adequate under normal operating conditions, the building industry will need to develop and follow a strict set of ventilation design practices. New practices should not compromise safety or create excess energy use.

Prepared by Sheltair Scientific Ltd. Prepared for Innovation Centre for High-rise and Multiples, Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Duncan Hill. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

IDENTIFYING AND REMOVING POLLUTANTS FROM HEAT RECOVERY VENTILATORS

This study investigated the presence of allergens such as dust and molds in heat recovery ventilation systems and the duct work. It also looked at two different types of cleaning equipment and their ability to clean these pollutants from the rigid and flexible ductwork and heat recovery ventilator (HRV) cores in dedicated balanced supply and exhaust ventilation systems. Samples from the ductwork and cores of ten ventilation systems were tested for levels of dust and mold. The ductwork and cores were then cleaned using standard ductwork cleaning apparatus, then tested again to indicate the success of the cleaning process. All houses were tested for air and surface mold counts using an RCS air sampler and typical swab collection systems. Two of the ten houses were re-tested over a period of fifteen months. There were high mold counts on the surfaces of the supply air ducts. However, there was no correlation to house air mold counts, which were found to be inconclusive. It could not be determined whether airborne molds were considered a health risk in the houses as tested. It was also found that conventional equipment was not effective in cleaning the ductwork systems.

Prepared by Terry Watters, Sustainable Housing and Education Consultants Ltd. CMHC Project Officer: Don Fugler. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

TESTING OF DOMESTIC OIL TANKS

This report describes research to find a method to test domestic fuel oil tanks for potential leaks and suitability for future service. After an introductory statement the first section offers a description of the construction of the type of tank under study, an explanation of the failure mode addressed as well as some assumptions concerning the tests investigated. The next section explores inspection techniques currently practised by various organisations. The final section examines a number of potential test methods.

Prepared by William Moody, Moody Engineering Consultants. CMHC Project Officer: Darrel Smith. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

TESTING OF RESIDENTIAL HEATING AND VENTILATION SYSTEMS FOR THE NORTHERN ENVIRONMENT

Heating and ventilation have always been critical concerns of homeowners and the housing industry living and conducting business in the North.

With the rise in fuel prices in the mid 1970's there has been an ever increasing emphasis on energy efficiency. Along with the benefits of building dwellings in an energy efficient manner, come corresponding problems - the chief of those problems concerns maintaining a healthful level of indoor air quality.

Several heating and ventilation schemes have been developed to provide adequate fresh air to a dwelling, but none specifically for the Yukon environment. Equipment testing is generally not done below -20°C, which is sufficient for the larger Canadian market, but not for trouble free operation in the North with its extended periods of -40°C or colder temperatures.

As well, the lifestyle of Northerners is different from those in more southerly climes. Many Yukoners do not venture out of the home during cold snaps, and tend to sit close to the heat source, with all sources of cold draughts sealed tight against the cold - often including designated sources of fresh air to the dwelling.

The 1995 National Building Code created a further complication for homeowners and builders alike. The air change rates, which are mandatory through the 1995 code - even during times of severe cold - have been questioned by both builders/installers and knowledgeable homeowners as being excessive.

This report is the culmination of Phase I, of a four phase project, which will attempt to provide answers to many of those questions by installing several different configurations of heating/ventilating systems, and monitoring them. This will provide an opportunity, as well, to validate or disprove the requirements of the code as it applies in a northern environment and possibly make recommendations to the NBC Standing Committee on Heating, Ventilating and Air Conditioning.

This report contains the results of Phase I of the project described above. The phases of the project are:

Phase I - Scope of the Problem
Phase II - Background Research and Study Design
Phase III - Field Research
Phase IV - Evaluation and Reporting

Phase I consisted of the administering of two questionnaires, one to homeowners, and another to industry stakeholders. Their replies provide a true perspective of what problems and difficulties are being encountered with heating and ventilation systems and provide the project with an understanding of where attention should be focused. Various complaints are heard from homeowners and housing professionals in the North regarding heating and ventilation systems. These complaints cover a range of concerns and problems which the questionnaire results would verify or dispel.

A joint venture research and development project undertaken by Canadian Home Builders Association - Yukon and Yukon Housing Corporation. Funding provided by Canada Mortgage and Housing Corporation. CMHC Project Manager: Darrel R. Smith. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

HEATING & VENTILATION

WHEN YOU REOCCUPY YOUR HOUSE AFTER A PROLONGED WINTER POWER OUTAGE

As part of the *About Your House* Consumer Fact Sheet series and in response to the recent ice storm in Eastern Ontario and Quebec, a fact sheet on what steps you need to take when you return to your home during a prolonged winter power outage has been prepared. Tips are provided on turning on the heat, water, electricity, and roofing issues for when you reoccupy your home.

About Your House Fact Sheet; CE 11. Ottawa: Canada Mortgage and Housing Corporation, 1998.

Order number: 60356

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : À votre retour à la maison après une longue interruption de courant en hiver.

WOOD HEAT SAFETY IN AN EMERGENCY

As part of the *About Your House* Consumer Fact Sheet series and in response to the ice storm in Eastern Ontario and Quebec, a fact sheet on wood heat safety in an emergency situation was prepared. General tips are provided on getting the best out of wet wood, safe operation of wood stoves and fireplaces, temporary wood stove installation hazards and decorative fireplaces.

About Your House Fact Sheet; CE 10. Ottawa: Canada Mortgage and Housing Corporation, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Le chauffage au bois en toute sécurité lors d'une situation d'urgence.

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

BEST PRACTICE GUIDE: FLASHINGS

This Guide and companion CD-ROM provides architects, engineers, designers and builders with a general understanding of the principles and best practices in design and construction on flashings. This 150 page Guide and companion CD-ROM includes information about materials and installations, controlling forces, directing water flow, surface tension and capillary action, and builder-designer checklists.

Prepared by Ashok Malhotra and Herb Otto. Ottawa: Canada Mortgage and Housing Corporation, 1998.

Order number: NE6919 ** Price: $89.00 + GST and handling charges.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre: Guide des règles de l'art: Solins.

BRICK VENEER CONCRETE MASONRY UNIT BACKING. BEST PRACTICE GUIDE: BUILDING TECHNOLOGY

One of the major contributors to envelope defects has been a failure to apply existing knowledge of envelope construction in the form of details that builders can use during construction. The Best Practice Guide series is intended to encourage state-of-the-art construction by providing detailed description and CAD details of building features that can be adapted and developed by professionals to suit the particular conditions of their buildings.

Chapters 1 and 2 of this guide describe the various components and materials used in brick veneer/concrete masonry unit backing. They also provide references to relevant industry standards.

Chapter 3 outlines the building science concepts that underpin the CAD details in the rest of the guide.

CAD details in Chapter 4 illustrate such features as window sills, parapets, curtain walls and patio doors. Explanatory notes outline how each feature works, and checklists are provided for designers and builders. An accompanying diskette contains AutoCAD files of the details in chapter 4.

Chapter 5 supplements the earlier descriptions with specifications for masonry wall design and construction. Chapters 6 to 8 deal with construction sequencing, inspection, quality control and commissioning the building envelope. Chapter 9 offers guidance on maintenance and repair.

A reference section lists other useful publications on masonry construction, design and research. The appendix is a guide to the use of the diskettes.

Prepared by Ashok Malhotra and Herb Otto. Ottawa: Canada Mortgage and Housing Corporation, 1997.

Order number: 6917E. ** Price: $89.00 + GST and handling charges.

Binder format + 24 Easy to use CAD drawings on CD-ROM.

The CD-ROM CAD drawings are PC format and convertible to MAC format (instructions provided in the guide). This product is sold as a package. The CD-ROM is not available separately.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Fonds en blocs de béton et placage de brique (6918F)

BUILDING ADAPTABILITY: A SURVEY OF SYSTEMS AND COMPONENTS

This report looks at current theory and technology from exhaustive international sources addressing the adaptability of buildings. In light of this, actual Canadian case studies are considered and some guidelines are formulated for designers facing the opportunities and problems associated with adaptability. The outcome of the research is seen as an information tool for designers and builders. The work is primarily concerned with medium-rise to high-rise construction, and the scope of research is focused on but not restricted to residential programmes.

The study reviewed historical, social and design perspectives on why and how buildings change and identified the two fundamental and complementary approaches to adaptability : one based on design and another based on technology. These approaches were then tested through the examples of ten building conversions. This process yielded nine principles that could be followed during the design process of a building. In implementing these principles, a number of options in systems and components become possible and these are explained in a set of guidelines that relate specifically to elements of the building envelope, structure and environmental systems.

The study asserts that awareness of the potential for adaptability could in itself be a significant factor in designing adaptable buildings; when enhanced with the knowledge of principles and practical guidelines it could be a decisive factor in increasing a building's future potential and its environmental benigness.

Prepared by Young & Wright Architects Inc., in association with Engineering Interface Limited and Yolles Building Science Services Limited. Ottawa: Canada Mortgage and Housing Corporation: CANMET, Natural Resources Canada, 1997.

AVAILABILITY: Canadian Housing Information Centre

COMPARTMENTALIZATION OF EXISTING HIGH RISE APARTMENT BUILDINGS: FINAL REPORT

Morrison Hershfield evaluated the potential benefit of air sealing interior partition walls and floors as a method of air leakage control in an existing 15 storey apartment building. Data on the leakage characteristics of separating elements was obtained by field testing and data used to model the building with CONTAM94. The model was calibrated against measured pressure differences across exterior walls, partition walls and floors. Modelling runs with modified leakage characteristics of partition elements were carried out to evaluate potential reduction in air change due to sealing suite partition walls and doors. It was found that such measures did reduce stack driven air change but that the economic benefit was relatively small when considering the building as a whole.

Prepared by Mark Lawton, Morrison Hershfield. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Duncan Hill. Ottawa: CMHC, 1997. (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

EFFECTIVENESS OF A CORROSION POTENTIAL METHOD FOR EVALUATING POST-TENSIONED TENDONS - AN EVALUATION REPORT

The Institute for Research in Construction (IRC) of the National Research Council Canada (NRC) was requested by Canada Mortgage and Housing Corporation (CMHC) to evaluate some of the more promising techniques which claim to evaluate, repair or protect the condition of unbonded steel cables in post-tensioned building components. Three of the techniques, one evaluation and two protection, selected for this study, are owned by the same proponent. This report presents the evaluation of a corrosion potential method, a technique developed and marketed by the proponent to assess the state of unbonded tendons in post-tensioned concrete members.

The corrosion potential method estimates the probable extent of corrosion of unbonded tendons by a) measuring the moisture content of the air within tendon sheaths, b) correlating these measured conditions with the states of corrosion observed in a representative sample of tendons pulled from the member and c) estimating the corrosion condition of all tendons in the member using the derived relationship between moisture content and state of corrosion. Two approaches have been devised to implement the corrosion potential method:

1. The "Pilot Project Approach" is prescribed for members undergoing their first field evaluation. This approach limits expenditures by restricting testing to a small percentage of tendons, randomly selected from the member.
2. The "Full-Scale Testing" of all cables is recommended when previous tests have identified an extensive moisture/corrosion problem within the member.

The two approaches appear suitable for post-tensioned structures as they take into consideration the needs and resources of building owners.

Using the Full-Scale Testing Approach, field evaluation of the corrosion potential method was conducted on a floor slab in a building in Calgary, Alberta. Moisture contents were obtained by the proponent's personnel using hand-held tools and equipment and were classified using six grades of wetness developed by the proponent. The grades simplified the presentation and evaluation of moisture contents and their correlation with observed corrosion conditions.

The size and composition of the sample of tendons removed from the member is crucial to the statistical determination of cable corrosion conditions. The proponent has recommended that for "Full-Scale Testing" from 2% to 5% of the total tendon population be removed for correlation purposes. Based on tests conducted in Calgary, the authors suggest that the number of samples obtained by removing tendons be not less than 15 and that removed tendons closely reflect measured moisture conditions within the member.

The proponent used a system developed by Read Jones Christoffersen (RJC) of Calgary to visually grade the corrosion condition of removed tendons. The system appears well suited for the task but the rated levels of corrosion are examiner dependent. Correlating measured moisture conditions with corrosion conditions does yield a reasonable view of cable conditions with a member. The corrosion potential method can, therefore, be considered a practical technique for estimating the probable extent of corrosion of unbonded tendons provided representative tendons are selected for the correlation.

Prepared by G. Pernica and A.H. Rahman, Institute for Research in Construction, National Research Council Canada. Prepared for Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

EFFECTIVENESS OF AN ACOUSTIC CONTINUOUS MONITORING SYSTEM FOR POST-TENSIONED BUILDINGS: AN EVALUATION REPORT

The effectiveness of an acoustic continuous monitoring system in reporting the time and location of wire ruptures in unbonded post-tensioned tendons of buildings has been evaluated.

When installed in a structure containing unbonded post-tensioned tendons, the monitoring system picks up and records acoustic signals created by the rupture of a tendon wire and by other impact phenomena using an array of accelerometers, a pre-trigger device and an on-site, computer-based data acquisition system. Computer software, incorporating an artificial learning network, analyzes the recorded signals to identify and locate wire rupture events.

The system was evaluated by NRC/IRC in a post-tensioned building by cutting individual tendon wires and by intentionally producing other types of impacts on concrete members. Several months of data obtained from monitoring systems placed in two other buildings were also examined to evaluate the ability of the system to detect spontaneous tendon ruptures.

Based on this investigation, the acoustic monitoring system was considered effective in reporting the time and location of tendon ruptures in the monitored part of an unbonded post-tensioned building. Using the system to monitor the behaviour of a new building or an older building in which the existing condition of the tendons has been established by other techniques, can provide valuable information to assess the structural impact of tendon rupture at any time during the building's life.

It is recommended that the system be further developed to incorporate the capability of reporting the number of rupturing wires producing an acoustic event and to improve the reliability in locating the tendons in which the wire ruptures occurred. This additional information will help improve the accuracy of structural assessments and thus minimize the need for supplementary destructive field investigations.

Prepared by A.H. Rahman and G. Pernica, Institute for Research in Construction, National Research Council Canada. Prepared for Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

EFFECTIVENESS OF AN ELECTROMAGNETIC WAVE PROPAGATION TECHNIQUE FOR THE CONDITION ASSESSMENT OF UNBONDED POST-TENSIONED TENDONS: AN EVALUATION REPORT

The effectiveness of an Electromagnetic Wave Propagation Technique (EWPT) in detecting and locating defects in unbonded post-tensioned tendons and measuring the loss of cross-sectional area (LCA) at such defects has been evaluated.

The technique works on the principle that an elecromagnetic pulse transmitted through a tendon from one of its ends is reflected from defects in the tendon such as corrosion pits and wire breaks. The distance of a defect from the transmitting end of the tendon is calculated from the arrival time of the reflection and its severity (depth and length) from the reflection's duration, amplitude and shape.

A protocol was prepared by the Institute for Research in Construction (IRC) of the National Research Council Canada (NRC) for the purpose of this evaluation. In accordance with the protocol, tests were conducted in three buildings in Calgary on a total of 86 tendons of various lengths and two sizes. The most important objectives of these tests were to determine the accuracy of defect detection and measurement of LCA, the influence of environmental factors such as water in the tendon sheath, nearby electrical fields and electrical contact with other tendons and metals, and the reproducibility of the technique's findings.

Tests showed that the technique is ineffective in detecting defects and measuring loss of cross-sectional area in unbonded post-tensioned tendons. The technique could not detect a majority of the defects, some as severe as completely broken cables. On the other hand, it reported a very large number of defects that did not exist. The technique appears to be influenced by the presence of electrical conduits near tendons and by electrical contact of tendons with metals although more testing is required to confirm this observation.

The technique in its current state is therefore not recommended for assessing the condition of unbonded post-tensioned tendons.

Prepared by A.H. Rahman and G. Pernica, Institute for Research in Construction, National Research Council Canada. Prepared for Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

FIELD INVESTIGATIONS OF INDOOR ENVIRONMENT AND ENERGY USAGE IN MID-RISE RESIDENTIAL BUILDINGS

The focus of this study was to evaluate the thermal and indoor environment performance of mid-rise buildings, more specifically three to five storey apartments. The research plan included the development of test and evaluation protocols for indoor environment parameters, energy consumption patterns and ventilation system performance parameters for mid-rise buildings. As part of the field work, a total of eight buildings were chosen for detailed evaluation; four buildings in Vancouver, two in Ottawa and two in Toronto. All the buildings were built in the last five years (1990 or later) to reflect current design and construction practices.

Mid-rise residential buildings had the necessary ventilation and exhaust equipment installed to meet the code requirements. However, the performance evaluation showed that these exhaust and ventilation systems did not function to the required level and generated significantly low air movement in the building.

Make-up air systems provided the fresh air in corridors which eventually dumped to the outside due to a lack of proper transfer mechanism between the corridor and the suites. The under-performance of ventilation systems also seem to cause high levels of relative humidity, high levels of carbon dioxide, window condensation and mold growth in several buildings. In several buildings, relative humidity and carbon dioxide levels exceeded the normal acceptable limits set by Health Canada Guidelines. These buildings also had insufficient ventilation and air movement in the suites. Occupant complaints are also high. The occupant complaints in these buildings seem to be due to improper and/or lack of adequate ventilation and air distribution.

Comparison showed that the mean value of the energy consumption for a high-rise and mid-rise building is almost the same. Compared to a single family house, the mid-rise residential units had about 10% less energy consumption per unit area despite the fact that mid-rise units had significantly less exposed surface area than single-family houses. Overall, the field survey and energy analyses provided significant new insights into the mid-rise apartment buildings. These findings should help in future design, construction and commissioning of apartment buildings.

Prepared by Scanada Consultants Limited. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: Duncan Hill. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

WOOD FRAME ENVELOPES. BEST PRACTICE GUIDE, BUILDING TECHNOLOGY

Designers, builders, building owners and managers who consult this guide should gain a general understanding of the principles and practical considerations of designing and constructing wood frame envelopes. The Guide emphasizes the best residential construction practice details and specifications used in design offices and on construction sites across Canada.

The information includes the behaviour of wood in construction, moisture control strategies, heat flow mechanisms, typical envelope assembly characteristics, components and materials for inclusion in specifications, quality assurance, maintenance and renewal strategies. More than 30 clearly drawn construction details on CD-ROM are easy to download into a CAD program. Metric and imperial measures, French and English in different layers.

Prepared for Canada Mortgage and Housing Corporation by Otto Bryden Erskine Martel Architects Inc., and subsequently by Otto and Erskine Architects Inc., in joint venture with Halsall Associates. The National Research Council of Canada, the Canadian Home Builders' Association, the Canadian Wood Council and the New Brunswick Home Builders' Association assisted in development of this book. Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE6921 (61123) **Price: $89.00 + GST and handling charges.

AVAILABILITY : CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Enveloppe à ossature de bois.

WOOD-FRAME ENVELOPES IN THE COASTAL CLIMATE OF BRITISH COLUMBIA. BEST PRACTICE GUIDE, BUILDING TECHNOLOGY

Building in BC's coastal climate has special challenges -- and this 256 page guide is the most up-to-date, authoritative information available to help meet those challenges. This guide provides the most comprehensive technical information on how to build to withstand the conditions of BC's coastal climate.

The guide is intended to provide guidance, primarily to designers, for the design of the building envelopes of multi-unit wood-frame buildings in the coastal climate zone of British Columbia. The guide should also be useful to the construction industry in general, encouraging an understanding of the behaviour and performance of building envelope assemblies. Much of the material in the guide may also be applicable to other climate zones and building types.

Although the guide is intended to reflect good practice in general, its primary focus is on the management of moisture, since moisture-related performance problems prompted this initiative. The guide therefore does not deal specifically with structural, acoustic or fire and safety issues that may also have an impact on the design of the building envelope.

The information in the guide includes behaviour of wood in construction, moisture source control strategies, heat flow mechanisms, typical envelope assembly characteristics, and materials for inclusion in specifications, quality assurance strategies, maintenance and renewal strategies and more than fifty-three state-of-the-art CAD details showing several air barrier strategies, all included on the companion CD-ROM.

Endorsed by the Canadian Wood Council (CWC) and the Building Envelope Research Consortium (BERC).

HIGH-RISE AND MULTIPLE UNIT CONSTRUCTION

Prepared by RDH Building Engineering Limited in joint venture with Morrison Hershfield Limited. The two dimensional drawings were prepared by Hewitt Tan Kwasnicky Architects Inc. and the chapter on Behaviour of Wood was prepared by Don Onysko. Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE2178 (60959) **Price: $89.00 + GST and handling charges.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Enveloppe de bâtiments à ossature de bois dans le climat littoral de la Colombie-Britannique.

HOME OWNERSHIP

HOMEBUYING STEP BY STEP: A CONSUMER GUIDE AND WORKBOOK

This hands-on workbook provides users with everything they need to purchase a home. It covers all the steps in the process, from assessing housing needs to arranging a mortgage and closing the deal. Checklists and worksheets are provided to help in assembling the right information and make the right decisions and a glossary of homebuying terms is included.

Ottawa: Canada Mortgage and Housing Corporation, 1998.

Order number: NHA2040 (60946)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : L'achat d'une maison étape par étape.

HOMEOWNER'S MANUAL

The Homeowner's Manual was designed to provide builders with a tool to reduce the time and cost of customer callbacks. Builders can now provide their clients with a Homeowner's Manual filled with practical, easy-to-read information on operation and maintenance customized for their new home.

The Homeowner's Manual is a print-on-demand product to allow for customization. It is divided into three sections covering:

1. customized information based on the particular specifications of the individual home (e.g. type of roofing, foundation ...)
2. generic home care information, seasonal maintenance charts ...
3. a plastic sleeve for inclusion of the New Home Warranty, home plans ...

The Homeowner's Manual is endorsed by the Canadian Home Builder's Association (CHBA) as well as the Canadian New Home Warranty Council (NHWC). Builders who are members of the CHBA or provincial members of the NHWC will have the appropriate association logos printed on the cover of the product.

Builders who purchase this manual for their customers will be providing outstanding customer service, enhancing their professional image and reducing after-sales service costs.

The primary benefit to homeowners is a customized and comprehensive permanent reference tool to help them operate and maintain their new home. It has easy-to-follow text, lots of clear illustrations and environmental, money-saving and health tips.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE2322 (61841) **Price: $39.95 + GST and handling charges.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Manuel du propriétaire-occupant.

HOMELESSNESS

WOMEN ON THE ROUGH EDGE: A DECADE OF CHANGE FOR LONG-TERM HOMELESS WOMEN

There have been significant changes over the past decade in the profile of women's homelessness and the service context. The proportion of women who use the emergency shelter system in Toronto increased from 24 to 37 percent from 1988 to 1996. As more women become homeless and the existing social service and health system is less able to assist them, the most vulnerable stay homeless for longer periods.

This report constitutes a retrospective review of the changing patterns of women's homelessness in the Toronto area from 1987 to 1997, with a focus on conditions and services for long-term homeless women, based on the observations and expertise of those who have worked closely with homeless women over the previous decade. Interview data from a small number of homeless women are included, along with a research-based profile of long-term homelessness among women in Toronto.

The report discusses distinctions in shelter and other service use patterns among homeless women (i.e., transitional, episodic, and chronic homelessness) and implications for housing and support service requirements. Women who are homeless for long periods of time face similar circumstances as other homeless women except that their personal resources are fewer, their state of physical and mental health poorer, and their individual capacity to cope is weaker. They are very likely to have severe mental health problems, and it appears that the prevalence of addictions is increasing.

Prepared by Sylvia Novac, Joyce Brown, Gloria Gallant. CMHC Project Officer: Brenda Baxter. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

AVAILABILITY : Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Femmes en difficulté.

APPLICATION OF STRUCTURAL STEEL TO SINGLE-FAMILY RESIDENTIAL CONSTRUCTION

This study is an investigation of the use of structural steel in single-family residential construction, and an analysis of its applicability to Canada, taking into account technical requirements, cost-effectiveness, and sustainability.

With the rise of housing costs, global competition, and increasing environmental concerns, new systems and innovative uses of material are required to supplement the existing construction methods. Numerous studies have demonstrated the potential of steel for building and its advantage in terms of price, performance, and physical properties. Residential projects in steel are usually built with lightweight metal framing systems. Structural steel is seldom used, although it offers additional advantages in terms of performance, economy, flexibility, and speed of construction, as well as a wide availability of skills, trades, and experience from the commercial and industrial building sector.

The purpose of the study is to provide to decision-makers in the building industry a clear view of the possibilities offered by the application of structural steel to housing.

The 200-page report addresses the following topics:

- steel and metal building systems in the context of housing;
- existing steel houses worldwide and in Canada;
- source of information for steel technology;
- compliance with building codes;
- Canadian steel suppliers and trades;
- prototype design of a steel house;
- steel house and sustainability.

Prepared by Michel de Spot, Node Engineering Corp. CMHC Project Officer: Rob Duncan. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

BUILDING SOLUTIONS: A PROBLEM SOLVING GUIDE FOR BUILDERS AND RENOVATORS

This publication was developed to assist builders in reducing the expense and aggravation of construction defects and call-backs. This helpful guide explains the likely causes of common construction problems and provides advice on how to prevent the problems from occurring and solutions to make the job go smoothly. Solutions to ... Improperly installed siding. Preserved wood foundations. Leaky and unsightly roofs. Nail pops on drywall. Cracked basement foundation walls. It's all here!

A must-have for those learning residential construction and a great refresher for builders, renovators and trades people. A good investment for self-builders too. It includes a handy glossary.

Features 6 Chapters: Building Foundations, Flooring Systems, Wall Systems, Roofing and Ceiling Systems, Indoor Air Quality and Ventilation Systems and Noise Control.

Ottawa: Canada Mortgage and Housing Corporation, 1998.

Order number: NE2004 (60941) ** Price: $34.95 + GST and handling charges.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre: Solutions de construction: recueil de solutions à l'intention des constructeurs et rénovateurs.

DEVELOPMENT OF GENERIC ENGINEERED DETAILS FOR THE CONSTRUCTION OF RESIDENTIAL TALL WALLS

Part 9 of the Alberta Building Code (1997) defines maximum allowable heights for exterior loadbearing walls based on their physical characteristics and the loads they support. The code, however, only specifies requirements for walls up to approximately 12 feet in height. Walls exceeding that height must be individually engineered. Significant time and expense could be saved through the availability of generic, engineered data which would allow builders in Alberta to select appropriate material and installation configurations for the tall wall requirements incorporated in their various projects. The purpose of this project was to develop such data.

Several general configurations were identified for analysis. These configurations included both solid walls and walls with varying window layouts. The range of wall dimensions was 7 to 16 feet in width by 10 to 20 feet in height. Some appurtenant components generally thought to provide additional support for tall walls were also included in the analysis. These included horizontal feature shelves, fireplaces located in corners and intra-span, interior partitions, and hip roofs.

Developmental work followed generally accepted principles of limit states design. Load carrying capacity and lateral deflection were defined as the governing limit states. The general design philosophy encompassed examination and classification of live loads throughout the province, and development of tables that link the load classification at a particular location to allowable tall wall characteristics for that location.

Two types of tall walls were developed. The first case - tables which identify the maximum widths of loadbearing walls of given height - was chosen as a means of addressing the option to construct tall walls in two vertical lifts. The second case - tables that identify the maximum height to which a loadbearing wall may be built - addresses the option of building tall walls with full height stud members. In the first case, stress and deflection due to wind loads constituted the governing conditions. Allowable deflection was set at 1/180 of the width of the wall. In the second case, the combination of axial loading and bending moments caused by wind loading was considered, and either stresses or deflections governed the allowable height of the wall, depending on load combination.

The structural contributions of the appurtenant components studied were found to be minimal. From the generic perspective, whatever contributions could be afforded by these items would be lost to design allowances that would have to be made to compensate for the large number of variables associated with their installation. These variables include vertical and horizontal positions on the wall, materials used, and fastening methods used. Details describing these items would have to be intricate and the potential for another field variable - misapplication of intended specifications - would likely be introduced.

The tables developed within the scope of this project allow extension of the existing limits of the Alberta Building Code, 1997 edition. Table 9.23.10.1 of the code allows walls up to approximately 12 feet in height to be built without professional design input. Properly utilized, these tables allow the construction of walls up to approximately 25 feet in height (dependent upon load conditions) to be built in Alberta without professional design input. Some situations will exist where the tables do not address the requirements of a particular project or a particular project cannot comply with the conditions accompanying the use of the tables, and in these circumstances, individual professional design will remain a requirement.

Prepared by Campbell Woodall & Associates Consulting Engineers Ltd. CMHC Project Manager: Darrel R. Smith. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1999.

AVAILABILITY: Canadian Housing Information Centre

RESIDENTIAL DECONSTRUCTION MANUAL

The intent of this manual is to provide project managers (architects, engineers, interior designers, associated technicians and technologists, contract administrators, contractors, and site supervisors) involved in residential (single family and multi-unit) demolition with a reference tool to assist them in the economic feasibility assessment, planning and supervision of deconstruction.

Prepared by Derek Badger. CMHC Project Manager: Darrel R. Smith. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

RESIDENTIAL GUIDE TO EARTHQUAKE RESISTANCE

This publication is intended as a reference guide for builders, renovators, architects, engineers, technologists, municipal officials, and other knowledgeable parties working with existing and new single family homes. It focuses on existing wood-frame homes but is also applicable to new construction. The information in the guide may be applied in all of the high risk areas in Canada (both coasts, the Montreal/Quebec City area, the Ottawa Valley, and some northern areas).

Order number: NE6995 (62098) ** Price: $39.95 + GST and handling charges.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre: Guide d'améliorations de la résistance des habitations aux séismes.

FUTURE OF THE INTERNET AND THE HOUSING SECTOR

This study examines the extent of the usage of the Internet in the housing sector. It also briefly explains the Internet and its main features, the history of its general usage, growth worldwide and the opportunities it provides for the housing sector over the next few years. Trends associated with Internet usage are discussed for the following areas of the housing sector: housing construction; the real estate sector, housing financing and evaluation; governments and government agencies; industry associations and urban planning in general. The study provides a useful listing of housing-related Web sites in Canada and the United States in such areas as: institutional and government agencies; construction and architecture; real estate; financing and mortgage loans; planning and related specialties and co-operative housing.

Prepared by Syllable Internet Expressions Inc. Reviewed and supplemented by Florence Millerand. Prepared for Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series: Research Report)

Order number: PE0317 (61591)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Internet et le secteur d l'habitation de demain.

INTERNATIONAL COVENANT ON ECONOMIC, SOCIAL AND CULTURAL RIGHTS BACKGROUND REPORT: THIRD REPORT OF CANADA ARTICLE 11: HOUSING

This report is a supplement to the *Third Report of Canada* to the United Nations on progress achieved under the International Covenant on Economic, Social and Cultural Rights. Using the reporting guidelines suggested by the UN for the housing aspects of Article 11, this background report provides an overview of the Canadian housing system, in-depth coverage of housing needs in Canada, and detailed descriptions of measures taken by the federal government to address housing needs. Topics include: homelessness, core housing need, housing needs of children, Aboriginal peoples and persons with disabilities, enabling strategies, improving housing affordability and choice, and housing-related expenditures by governments. An index of activities, initiatives and programs is appended. The report primarily covers the period January 1, 1990 through December 31, 1994, with updates to the end of 1997 included as appropriate.

Ottawa: Canada Mortgage and Housing Corporation, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Le Pacte international relatif aux droits économiques, sociaux et culturels : document d'information.

GUIDE TO AFFORDABLE HOUSING PARTNERSHIPS

Today, partnerships have become more and more common in both the private and public sectors as a way of stretching limited resources and achieving strategic objectives. To help you work with other individuals and organizations to address housing needs in your community, Canada Mortgage and Housing Corporation has developed this guide. This guide is intended for individuals and organizations in the non-profit, public and private sectors who have an interest in providing affordable housing for families, single persons, seniors and people with disabilities.

A partnership in housing is an arrangement between two or more parties who agree to work together to achieve shared or complementary housing objectives. Partnerships in housing can be applied at different stages in the life cycle of housing creation - asset creation, maintenance or renewal. They may also be formed to solve housing problems and issues through program and policy development. Partnerships vary in their duration and in their level of formality. Partnerships in housing, except under federal and provincial housing programs, are a relatively new way of delivering housing in Canada. Nevertheless, an impressive number of initiatives have been undertaken or are currently underway. Examples of partnership approaches are given throughout the guide to help gain a better understanding of the partnership process and how it can be applied to the provision of affordable housing.

Prepared by the consulting team of Linda Lapointe of Lapointe Consulting Inc., Lauren Millier and Greg Spafford of PricewaterhouseCoopers and Luba Serge. Ottawa: Canada Mortgage and Housing Corporation, 1999, c1998.

Order number: NE2216 (60968) **Price: $19.95 + GST and handling charges.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Guide des partenariats de logement abordable.

MUNICIPAL REGULATORY INITIATIVES: PROVIDING FOR AFFORDABLE HOUSING

This report examines three types of regulatory initiatives used by municipalities to provide for affordable housing. These consist of inclusionary zoning, a variety of exaction programs including linkage fees, and density bonusing -- also known as incentive zoning in many places.

All these initiatives rely on the development approval process to encourage, enable or require for-profit developers in some way to provide for housing affordable specifically to lower-income households. While only used to a limited extent in Canada, they have been increasingly used across the United States since cutbacks to federal funding in the early 1980s.

This report is intended to make the opportunities offered by these initiatives more widely known to local housing officials and others involved in the development of affordable housing in Canada.

The recent experience with these initiatives in both countries is reviewed, drawing upon both published and municipal reports as well as extensive telephone interviews. The findings are presented mainly through an overview of the three types of initiatives and profiles of two dozen of the most important of representative examples.

Prepared by Richard Drdla Associates Inc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project officer: David Scherlowski. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series Research Report)

Order number: PE0326 (61594)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Initiatives de réglementation municipales

NEW WAYS TO CREATE AFFORDABLE HOUSING : RESULTS OF A NATIONAL SURVEY OF HOUSING PROVIDERS - FINAL REPORT

The Canadian Housing and Renewal Association (CHRA) and Canada Mortgage and Housing Corporation (CMHC) entered into a partnership arrangement in 1997 to investigate activities being undertaken by the non-profit, municipal and co-operative housing sector to develop affordable housing without traditional government housing supply programs. A survey was undertaken to identify:

- the level of interest, capacity and willingness of these groups to develop affordable housing;
- innovative approaches that have been used, attempted or considered;
- tools, mechanisms and information that may be needed to implement innovative approaches; and
- interest in creating a system to facilitate the ongoing sharing of information on "best practices" and the preferred format and medium.

A total of 186 organizations responded to the survey. Most of the respondents were traditional housing providers, community based non-profit housing groups, other non-profits and municipal non-profit groups. Although not a random survey, and therefore not representative of the entire population of housing organizations, the results are indicative of the nature of current affordable housing activity across the country, and do provide insights into the views of housing providers on a range of relevant issues.

Prepared by Deborah Kraus and Margaret Eberle. Sponsored by the Canadian Housing and Renewal Association and Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

RESEARCH ON AN IMPROVED MEASURE OF AFFORDABILITY FOR ESTIMATING HOUSING NEED IN CANADA

This study was undertaken to assist the Federal/Provincial/Territorial Partners in their review of the standard for housing affordability used in estimating Core Housing Need. Specifically, the report examines whether there is an alternative measure that better approximates housing affordability needs across the country than the current fixed 30-percent Shelter Cost-to-Income Ratio (STIR).

The study was comprised of three major components:

- Examining the fixed 20-percent STIR norm in relation to actual shelter spending patterns;
- Exploring alternative variable-STIR measures which aim to treat households with differing circumstances more equitably than is the case under a fixed STIR; and
- Estimating the number of households in need under the alternative approaches.

Prepared by Clayton Research Associates Limited in association with Fuller Information. Prepared for John Engeland, Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1997. (Housing Affordability and Finance Series: Research Report)

Order No. PEO311 (61587)

AVAILABILITY: CMHC Information products

NOTE : Aussi disponible en français sous le titre : Recherche sur une mesure améliorée de l'abordabilité pour estimer les besoins de logement au Canada.

ROLE OF PUBLIC-PRIVATE PARTNERSHIPS IN PRODUCING AFFORDABLE HOUSING: ASSESSMENT OF THE U.S. EXPERIENCE AND LESSONS FOR CANADA

This report examines how public-private partnerships (PPPs) have emerged in the United States as a delivery vehicle for the provision of affordable housing.

The report first reviews the historical factors and circumstances that bred the PPP system. This evolutionary period is contrasted with the conditions that prevailed in Canada. Part 1 briefly reviews and presents a conceptual framework to describe the range of mechanisms and measures that are used to patch together affordable housing.

Part 2 then introduces and reviews a set of illustrative case studies that were used to examine, in greater detail, how affordable housing projects and partnerships are structured and packaged in the United States. The key features of affordable housing projects and PPPs are highlighted.

Part 3 provides a brief overview of the Canadian context and reviews a smaller set of Canadian case studies. The experience in each country is juxtaposed as a way to help understand the differences that exist and the potential of some of the U.S. approaches to be adapted to fill voids in the Canadian system.

An overall assessment of the U.S. experience and the opportunities to expand the production of affordable housing in Canada through PPPs are the subject of Part 4.

Three detailed appendixes contain, respectively, greater detail on the mechanisms, measures and roles of key partners (Appendix A); profiles of the 15 U.S. case studies (Appendix B); and profiles of the seven Canadian case studies (Appendix C).

Prepared by Steve Pomeroy, Focus Consulting and Greg Lampert, Economic Consultant, in association with James Wallace, Abt Associates, and Robert Sheehan, Regis J. Sheehan and Associates. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: David Metzak. Ottawa: CMHC, 1998. (Housing Affordability and Finance Series Research Report)

Order number: PE0318 (61592)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Le rôle des partenariats public-privés dans la production de logements abordables.

SHELTER AFFORDABILITY AND HOUSING NEEDS: A STUDY OF WINNIPEG FOOD BANK USERS: FINAL REPORT

The purpose of this study was to examine the phenomenon associated with increased use of food banks in Manitoba and to develop a profile of the typical food bank user with respect to shelter needs and other sociodemographic variables. Specifically, the study sought to develop a research instrument and interview methodology that would address the unique sampling difficulties encountered when surveying this group and accurately assess the housing needs of local food bank users relating to shelter affordability, adequacy, and suitability. A random sample of 1,019 food bank users, stratified proportionally across 34 Winnipeg agencies, was used to answer questions regarding financial status, housing conditions and satisfactions, food bank usage, employment history, health and perceptions of prospects for the future and other sociodemographic information.

There was 582 men and 433 women who participated in face-to-face interviews during the winter of 1993-94. Results of this study showed that over 75 percent of the respondents in this study were receiving social assistance. The majority of the food bank users were young, single, employable males on welfare living in rented accommodations that consumed well over 50 percent of their monthly income.

The housing situations of all of the respondents were examined using the affordability, suitability and adequacy indicators from Canada Mortgage and Housing Corporation's core housing need model. Survey results on income and affordability issues indicated that food bank users do not have sufficient income to exist without some form of supplementary aid. Although shelter costs were low in terms of absolute dollar amounts, once shelter costs were subtracted from the food bank user's monthly income, there was very little left to obtain the basic requirements for existence. In other words, the majority of food banks users were shelter poor. While housing conditions were modest, they were reported satisfactory for the most part. Despite this high rate of general satisfaction with housing and neighbourhood, 25 percent of the respondents reported a lack of space and 20 percent reported housing in need of major repair.

Sub-populations selected for additional analysis included: welfare recipients; single parent families; families without children; single male, and single female households; households with seniors and persons with disabilities. Content analysis was performed on open-ended responses and on written observations made by interviewers during the interviews.

Data from the survey were combined with Statistics Canada 1991 Census data aggregated across forward sortation areas (FSAs) for 18 Winnipeg neighbourhoods. Results indicate a strong relationship between the socioeconomic status of a neighbourhood and the amount of food bank activity. Neighbourhoods in the core area, specifically R2W, R3B and R3C had the strongest relationship between low socioeconomic status and high food bank use.

The findings hold implications for the remaking of housing policy and social welfare policy in Canada.

Prepared by: Jeff A. Sloan and Data G. Stewart. CMHC Project Officer: John Engeland. Ottawa: Canada Mortgage and Housing Corporation, 1997 (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

HOUSING AND IMMIGRATION

A COMPARATIVE STUDY OF IMMIGRANT HOUSING, NEIGHBOURHOODS AND SOCIAL NETWORKS IN TORONTO AND MONTREAL

This study examines the relationships that exist between housing, neighbourhoods and social networks among visible minority immigrants living in metropolitan Toronto and Montreal. The importance of comparative research between cities and immigrant groups in order to dismantle the ideas of a singular "immigrant experience" is emphasized, as is the importance of intra-urban housing and neighbourhood-based processes within our largest cities in understanding the nature of settlement. The study focuses on Jamaican, Central American and Vietnamese immigrants living in Toronto, and the same groups, substituting Haitians for Jamaican immigrants, in Montréal. The objectives of the study are five-fold:

1. to examine where individual immigrant groups live in Toronto and Montreal and their degree of segregation;
2. to survey differences in housing conditions (tenure, dwelling type, cost, quality) between visible minority groups and to investigate factors which may account for such differentials;
3. to test the hypothesis that vertical immigrant enclaves in high-and low-rise buildings are replacing older inner city neighbourhoods as reception areas for immigrants;
4. to compare and contrast the housing experiences, residential satisfaction, perceptions of the city and neighbourhoods, and types of neighbouring between different immigrant groups; and
5. to probe the development of community through an examination of the ways in which immigrants have developed, use and gain support from social networks of kin and friends.

The study draws upon two data sources: the 1991 Canadian census and a questionnaire survey of 173 individuals. Among the study's major findings are: significant suburbanization of some immigrant groups in a variety of styles of housing with important variations between the two cities; somewhat poorer housing conditions for immigrants relative to British/French Canadians and that these differences in status are not simply a function of time of arrival, household income or family type; generally strong levels of satisfaction with housing and neighbourhoods among individuals in both cities; and the critical roles played by friends and family in facilitating post-arrival settlement over a period of years.

Prepared by Brian K. Ray. CMHC Project Officer: Roger Lewis. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

HOUSING DESIGN

DESIGNING FOR DISASSEMBLY

The intent of this research is to examine ways in which homes can be designed to facilitate future renovation, thereby reducing the generation of wastes. Although the principles of deconstruction are gaining popularity by demonstrating that used building materials can be reused or recycled, its practice and cost-effectiveness is viewed largely with skepticism. The labour intensity of salvaging used building materials is primarily due to the way in which homes have traditionally been constructed. Essentially, traditional design and construction give no consideration to the eventuality of renovation. As a result assemblies, components and building systems are joined, fastened and connected in a manner which makes disassembly difficult and wasteful.

This research was aimed at small to mid-size homes (900 to 1,800 square feet), single family dwelling units situated on standard urban and suburban sized lots. The report analyzes typical foundation, floor, interior partition, exterior wall, and roof assemblies to determine the obstacles to disassembly which currently exist. Examining the obstacles helped direct the research towards analyzing ways in which each of the assemblies could be re-designed to serve the same purposes and maintain their structural and aesthetic integrity but facilitate future disassembly to accommodate less wasteful renovation and deconstruction. The heart of the research lay in determining better ways to connect materials and building components. Through the examination of traditional construction and design, the purpose was to develop a set of principles and designs which fulfill the concept of designing for disassembly.

Effort was concentrated in researching available products and technologies which lend themselves well to future renovation and deconstruction. To test the viability of the research, the new design principles were scrutinized on the basis of cost-effectiveness (conceptually comparing the principles to traditional construction methods), industry acceptance (designers, contractors and trades people were surveyed to gain feedback), and public acceptance (potential home buyers and home owners were also surveyed to gain feedback).

Prepared by Vince Catalli, by dEsign consultants. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Darrel R. Smith. Ottawa: CMHC, 1998. (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

HABITATION ET FLEXIBILITÉ AU CANADA : BILAN 1991 : LA FLEXIBILITÉ VUE PAR LES ARCHITECTES

The main objective of this research was to carry out a precise analysis of the architectural solutions provided by Canadian architects for solving the problem of flexibility, presented as a criterion in the "Vivre en Ville" competition launched by the City of Montreal in partnership with the Canada Mortgage and Housing Corporation and the Société d'habitation du Québec.

This research has allowed the preparation of an inventory of the broad trends among the majority, as well as minority forms of expression that can be qualified as innovative. Inspired by considerations that were more social than technical, architects have first and foremost focused their thinking on the practicality and speciality of dwellings within the problematics of passing time. No model of flexibility that would be generally applicable to all operations without adaptation has emerged from the research. Architects responded in a balanced way by favouring a context-based approach (type of operation, clientele, site, etc.), occasionally providing several practical solutions in the same project.

To respond to the multiple variations of residential groups and lifestyle changes that are currently observable in Western society, flexibility remains a major operating concept for the various housing stakeholders whether in policy, demand, programming or housing design, if we are to be responsive to occupants' expectations and to the goal of sustainable, lasting housing.

Prepared by Annie Chélin. CMHC Project Officer: Maria Hanna Siedlikowski. Ottawa: Canada Mortgage and Housing Corporation, 1997. (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

LIGHT, SITE DENSITY AND FORM: A STUDY OF DAYLIGHT AVAILABILITY IN CANADIAN RESIDENTIAL BUILDINGS

Natural lighting has been linked to physiological and psychological beneficial effects on humans. In general it is desirable and preferable to electric lighting. Recognizing that a large and increasing amount of our daily activity cycle is spent indoors, the questions this project addresses are: What are the light levels found in residential buildings of various forms and in different settings? Can these levels be predicted on the basis of certain elemental descriptors such as location, building form, and site density?

The study developed two new terms with which to understand, assess and express light availability in residential buildings. Total daylight Factor (TDF) and Overhang and Density Obstruction Factor. The Total Daylight Factor is used to assess or compare daylight availability in a dwelling unit over a year or a chosen period. For example, values of dwelling unit TDFs in the study ranged from 0.58% for a north facing apartment suite to 1.45% for a townhouse. Winter TDF values for south facing rooms are six times higher than north facing rooms. The second new term, Overhang and Density Obstruction Factor (ODOF), sums up the effect building elements and density have on light availability. Detached houses and townhouses show typically ODOFs above 80%, indicating only a modest loss in daylight attributable to exterior obstructions in their normal setting. By comparison, apartments show a factor of 50% attributable to other buildings and a 20% when the effect of balconies is added.

The analysis of typical housing examples paints an informative picture of the availability of daylight in dwelling units for the entire year and for the winter season.

This study sets the ground for a more extensive and detailed analysis of factors affecting daylight availability and levels in residential buildings. It also builds the foundation for a method to predict daylight performance of dwellings and for a means to assist building designers and planners in assessing the impact of design decisions on daylight performance.

Prepared by Enermodal Engineering Limited. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, Research Division, 1998.

AVAILABILITY: Canadian Housing Information Centre

SPROUT: INFILL HOUSING FOR YOUNG, MIDDLE-INCOME FAMILIES: CASE STUDY = LA MAISON ESPACE VIVANT : LOGEMENT INTERCALAIRE POUR JEUNES FAMILLES À REVENU MOYEN : ÉTUDE DE CAS

In this demonstration project, an innovative home was built in Montreal to showcase how housing can be designed to change as the owners' needs for space change. It was the culmination of a long research and design process. In 1992, Montreal-based designer/builder Sevag Pogharian Design had approached Canada Mortgage and Housing Corporation's External Research Program with a proposal to examine new approaches to adaptable housing. The resulting 1994 report, *SPROUT: Designing Capacities for Incremental Change*, contained sketch plans for small, affordable detached and freehold townhomes with the capacity to grow up to three times their initial habitable area. Space and connections for potential expansions into the basement, attic and back yard would be built in during initial construction.

During this same time period, the City of Montreal was pursuing ways to encourage new housing downtown, and to revitalize its inner city areas. New development bylaws had been introduced into Montreal in the Fall of 1994, with an impact on infill projects. In addition, the Association provinciale des constructeurs d'habitations du Québec (APCHQ) wanted to publicize alternative designs and technologies in the housing sector. The three groups agreed that building an example of the "SPROUT" on an infill site would create media interest and allow the public and the housing industry to come and see these new ideas for themselves. It would also be an opportunity to test the flexibility of the City's new regulations, and help show how a small infill site could be transformed into desirable housing.

In the Fall of 1994, the designer/builder, Sevag Pogharian Design applied for an A.C.T grant to: investigate possible sites; consider regulatory requirements and obtain any required zoning amendments; design the house, and publicize the project, including holding an open house. The house was built in an expanded form, so that visitors could see its potential final size and use. The scope of the project was expanded and it became the first EnviroHome in Quebec -- meeting a stringent set of requirements for energy efficiency, resource conservation and a healthy indoor environment. While these features added to the final project costs, they also widened media exposure and increased public and industry interest in the open house. The educational value of the project has been significant, and it appears to be helping stimulate interest in revitalization in its Montreal neighbourhood.

Affordability and Choice Today (A.C.T.) Demonstration Project / Sevag Pogharian Design. Prepared by: Rowena E. Moyes. Prepared for Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations; CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Bilingual/bilingue

TAP THE SUN: PASSIVE SOLAR TECHNIQUES AND HOME DESIGNS. SECOND EDITION

This book covers all aspects to consider with respect to passive solar house designs and techniques: solar radiation, solar energy collection and window performance, heat storage and distribution, shading and summer comfort, window selection considerations, design integration and site planning, overheating. It also includes 20 sample house designs of three varieties: detached; semi-detached and townhomes.

The purpose of this book is to help make the best use of the sun's energy in a home. While much of the book contains information of interest to house designers and builders, homeowners will also find it valuable for its practical tips and as a primer on solar energy in general.

Includes a CD-ROM that contains the following:

- the Comfort Design Checker Software, an Excel-based program that estimates the appropriate window area for a planned house;
- the program's user manual;
- a database that lists window manufacturers and their product lines with all their specifications including data relevant to solar heat gain and heat loss;

- Heathy Housing files containing useful information on house design based on five Healthy Housing principles. These include images and graphic descriptions of CMHC's Healthy House in Toronto, which illustrates passive solar techniques in use;
- the *Tap the Sun: Passive solar Techniques and Home Designs* book itself, which will be fully searchable; and
- the house designs.

Text written by Leslie Jones of Leslie Jones Associates, with technical and editing assistance from Fanis Grammenos and Roger Henry. Jointly funded by Canada Mortgage and Housing Corporation and CANMET, Natural Resources Canada. Ottawa: CMHC, 1998.

Order number: NE2000 (60940) ** Price: $39.95 + GST and handling charges.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre: Capter le soleil: techniques solaires passives et modèles de maisons.

HOUSING EXPORT OPPORTUNITIES

ADAPTING CANADIAN HOUSING TECHNOLOGY TO INTERNATIONAL MARKETS: DESIGN, MATERIALS, COMPONENTS AND STRUCTURES

Canada has one of the most diverse and successful housing industries in the world. Operating from this solid base, hundreds of companies with housing-related products, technologies and systems to offer are operating in foreign markets. Many are looking actively for additional export and investment opportunities abroad. To succeed, they pay attention to differences from Canadian norms in national and local standards, cultural traditions, design and quality expectations.

This report answers three main questions: do buyers in foreign housing markets accept what Canadian firms have "off the shelf" at present?; how are Canadian exporters already adapting to specific requirements of foreign customers?; and what future opportunities exist to increase market share by adapting housing-related products, technologies and services?

Based on Statistics Canada export data, many Canadian housing-related materials and products already enjoy widespread acceptance in many foreign markets. Exporters assure buyers of the quality of goods through a variety of means, and also compete effectively on price, availability, and timeliness of delivery. Nevertheless, significant opportunities remain to expand market share through adaptation to local taste, conditions and standards.

Experienced housing exporters are already strongly committed to and acting on the idea of adapting what they sell in foreign markets. They alter design, colour, finishing, quality, performance, dimensions, language of literature or other features, in some cases substantially. However, more needs to be done to facilitate exchanges of practical information on this topic among current and prospective exporters, resulting in significant gains in Canadian export success. Against Canada's very able competitors in international housing markets, every marketing tool that can be created for Canadian firms is needed. Advantages to be gained over other Canadian firms by clutching best practices in many foreign markets are fleeting, if they exist at all. While there are obviously some proprietary technologies and products and commercial-confidential "tricks of the trade", most product and service adaptations are readily evident from published company literature. The potential market is often so vast that there is plenty of room for everyone from Canada, despite possible perceptions to the contrary.

Foreign private sector partners and government research institutes are increasingly likely to become partners in "co-evolving" a version of Canadian housing technology to meet their own circumstances and needs in future. However, this approach to adaptation must be approached with care, so as to avoid difficulties caused in Japan, for example, where Canada is more noted as a source of quality, competitively-priced lumber, than as a supplier of quality whole-house systems.

Certain Canadian companies focus on products, technologies and services specifically suited to international markets alone, mainly for "low cost" housing. With a few exceptions, the latter appear to be having only modest success at present. The most productive avenue for the future may lie in the direction of investing in local ventures and technology transfer rather than exports as such.

The report concludes with handy lists of key questions for potential use by Canadian companies exploring entry into new international markets or seeking to increase market share. These take the user through an issue-by-issue or element-by-element review of potential adaptation requirements and considerations.

The report also contains contract information for experts in the field, and references for additional reading.

Prepared by C. David Crenna, The Bayswater Consulting Group Inc. CMHC Project Officer: Rob Duncan. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

DIRECTORY OF SOURCES OF SUPPORT FOR CANADA'S HOUSING EXPORTERS. THIRD EDITION

The purpose of this directory is to summarize federal, provincial and other Canadian programs and services currently available to support the international commercial endeavours of Canada's housing industry.

Most of the resources identified are provided through federal departments and agencies and are related mainly to such areas as export promotion, financing, preparedness, training, market research, insurance and the provision of market intelligence and data.

Additional export resources include those provided by provincial agencies responsible for export promotion and expansion, the international trade expertise that resides in Canada's academic community, in private or non-profit sector organizations focused on expanding Canadian exports, and non-governmental trade organizations.

Ottawa: Canadian Housing Export Centre, Canada Mortgage and Housing Corporation, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Répertoire des sources offrant un soutien aux exportateurs canadiens du secteur de l'habitation.

EXPANDING THE KOREAN MARKET FOR RESIDENTIAL WOOD-FRAME CONSTRUCTION: FINAL REPORT

This report summarizes a study of regulatory and other impediments to the potential expansion of the South Korean market for Canadian-style wood-frame construction for multiple unit residential buildings. The overall goal of the study was to identify means of eventually increasing sales of Canadian wood-frame residential construction materials, equipment and professional services in South Korea.

The authors provide an overview of the housing market and summarize South Korean building code requirements which affect multiple unit residential construction and limit the use of wood structures. They discuss the activities of the South Korean housing industry in respect of wood-frame construction, as well as perceptions of a variety of South Korean sources regarding the possible expansion of the wood-frame construction market. Strategic considerations respecting this potential expansion of market are also identified.

Prepared by Larden Muniak Consulting Inc. in association with Sang-Man Youn Architect. CMHC Project Officer: Jay Thakar. Ottawa: Canada Mortgage and Housing Corporation, Canadian Housing Export Centre 1998.

AVAILABILITY: Canadian Housing Information Centre

HOUSING MARKET INTELLIGENCE STUDY OF JAPAN

Japan is one of the world's largest housing markets - housing starts averaged 1.5 million dwelling units annually during 1994-1997 period. This level of annual Japanese housing starts exceeds that of the United States over the same period (1.4 million) and dwarfs the 134,000 average annual starts in Canada.

Much of the market for housing products and services in Japan relates to the construction of single-family housing, which comprises roughly half of the country's total annual housing starts. Many countries including Canada are aggressively targeting Japan as a market for housing-related exports.

Access to market information and research expertise represents an important barrier to Canadian housing firms that are seeking to explore export opportunities in Japan.

This report comprises Phase 1 of a two-phase attempt to assist in this regard. Commissioned by the Canadian Housing Export Centre (CHEC) within Canada Mortgage and Housing Corporation (CMHC), the report highlights the availability, sources and quality of housing market information in Japan. The intent is to inform the Canadian housing industry about how to access important information on the Japanese market.

The Phase 2 study will provide an analysis of prospects for Canadian exports and an analysis of the penetration of imports into this market.

Ottawa: Canadian Housing Export Centre, Canada Mortgage and Housing Corporation, 1999.

AVAILABILITY: Available in PDF file on CMHC's Web site. To download this 47 page document visit CMHC's Web site at www.cmhc-schl.gc.ca, click on the Export Opportunities section and browse through the library.

NOTE : Aussi disponible en français sous le titre : Informations sur le marché de l'habitation du Japon.

INTERNATIONALISATION DE LA FILIÈRE HABITATION: UNE ANALYSE PERCEPTUELLE

In the rush of the global trade, an increasing number of Canadians firms are looking to foreign markets, and the housing industry is no exception. As domestic demand is down over previous years, prospecting new markets outside the country, is an avenue firms are increasingly less hesitant to explore. To date, however, the housing industry does not have its rightful share of exports, given its size in the Canadian economy.

This study is primarily a qualitative study based on about forty extensive interviews of corporate executives operating in three sub-sectors of the housing industry: professional construction services (builders, engineers, architects, etc.), manufacturers of building products and manufacturers of pre-fab homes. The interviews were conducted with firms from all corners of Canada. The purpose was not so much to identify the objective export-related difficulties as it was to see how corporate executives perceived these difficulties.

The study's conclusions are the following:

1. Firms generally tend to underestimate the difficulties, constraints and barriers related to international commerce.
2. For business, one of the main challenges in international business is delivering the product and the service within the required timeframes.
3. Corporate executives do not fear market globalization.
4. Few firms are concerned with diversifying their markets.
5. Businesses in the housing sector are not very familiar with the competition in target markets abroad.
6. Building systems which use wood have a harder time penetrating foreign markets.
7. Firms are reserved with respect to government assistance.

Prepared by François Cadotte. CMHC Project Officer: Joanne Hallé. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

STUDY OF FACTORY-BUILT HOUSING MARKET OPPORTUNITIES IN SOUTH-EASTERN U.S.A.

The purpose of the first of this two-part study was to investigate the potential niche markets open to Canadian manufacturers of factory-built housing in the Southeastern United States. Produced in late 1998, the report provides a substantive examination of the housing markets in Alabama, Georgia, Mississippi, North and South Carolina, and Tennessee. The author of the report states that these specific housing markets were targeted because this particular geographic area is experiencing strong economic growth and that this market is currently a fragmented residential construction market.

Data were collected through research tools such as telephone and personal interviews, analysis of previous research and demographic information on the primary geographic market.

HOUSING EXPORT OPPORTUNITIES

The research reveals there is a growing market for wall panels, as well as timber frame and log homes. A number of US builders interviewed for this project expressed an interest in developing a working relationship with Canadian manufactured housing firms.

Ottawa: *Canadian Housing Export Centre, Canada Mortgage and Housing Corporation, 1999.*

AVAILABILITY: Available in PDF file on CMHC's Web site. To download this 58 page document visit CMHC's Web site at www.cmhc-schl.gc.ca, click on the Export Opportunities section and browse through the library.

NOTE : Aussi disponible en français sous le titre : Étude sur les débouchés des maisons usinées dans le sud-est des États-Unis.

HOUSING FORCASTING AND DEMAND

DEMAND PROFILES FOR HIGHER-DENSITY HOUSING

This study examines the relationship between building types as defined by the relative density of projects and household characteristics. It uses the 1991 Census Public Use Micro Data Files (PUMF) to identify the characteristics that distinguish the demand for four types of dwellings:

- the single-family house;
- the duplex, row, semi-attached and attached options that will be referred to as the duplex and townhouse option;
- the under five-storey apartment building; and
- the highrise apartment.

It considers households as formed by couples with children, couples without children, lone parents, and people living alone or with other unrelated people.

The aim is to develop profiles describing the characteristics of households generating the demand for units in higher-density building types and to identify target populations whose entry into the medium-density housing options would contribute most to the goal of making our cities more compact while maintaining a reasonable level of risk in the marketing of units.

The study starts by examining the 1991 census data to describe the households and housing options of Ottawa residents. It links the propensity of the different household types to occupy each of the four buildings types with the Canada Mortgage and Housing Corporation (CMHC) long-run projections of households for the Ottawa region. These projections form a basis for the discussion of how changes in income and housing prices may affect future demand. The role of the existing stock is discussed and a base-line projection developed for the proportion of future housing starts that will be in higher-density buildings. The study concludes by describing household profiles that can serve as targets for the development of new higher-density housing options.

HOUSING FORCASTING AND DEMAND

Prepared by Andrejs Skaburskis. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Fanis Grammenos. Ottawa: CMHC, 1999. (Housing Affordability and Finance Series)

Order number: PE0341 (61605)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Profils de la demande de logements de secteur à haute densité.

HOUSING MARKET

THE CHANGING NATURE OF WORK AND FUTURE HOUSING ASPIRATIONS OF CANADIANS: INTEGRATED FINAL REPORT

This study explores some of the links between the labour market and housing. It identifies and explains the significant changes in working environments; analyses how these changes affect values and priorities with respect to housing and, consequently, demand for home ownership; and examines whether current home financing arrangements and underwriting criteria are responding to the changing nature of work.

Information was gathered through focus groups with members of the public in different employment arrangements and interviews with housing and finance industry professionals. The result was the development of three labour market scenarios from which projections for the future were extrapolated.

Prepared by Ekos Research Associates Inc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Benoît Sanscartier. Ottawa: CMHC, 1998.

Order number: PE0304 (61582)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : L'évolution du marché du travail et les aspirations des Canadiens en matière de logement.

THE IMPACT OF INHERITANCES ON THE HOUSING AND MORTGAGE MARKETS IN CANADA OVER THE NEXT 10 YEARS

It is thought that with generally rising house values, improved financial and retirement planning, and with enhanced pension plans and government benefits, today's seniors are better off financially than their predecessors. This has led to questions about just how much of that wealth will be transferred to younger generations and about the potential impact which these transfers might have on the housing and mortgage markets in Canada.

This research report investigates and provides answers to the following questions:

- What is the extent of the wealth that has been accumulated by today's seniors?
- How much of this wealth will be transferred to younger generations?
- Who will be the recipients of the wealth transfer?

- What are the anticipated uses of future inheritances?
- What will be the impact of inheritances on the housing and mortgage markets?

The report concludes with an assessment of the projected impact on major stakeholders in the housing industry and mortgage markets - new home builders, the existing home resale market, mortgage lenders, renovators, building product manufacturers and suppliers, recreational property developers as well as mortgage insurers.

Prepared by Clayton Research Associates Limited. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officers: David Metzak and Tim Elliot. Ottawa: CMHC, 1998. 57 pages.

Order number: PE0307 (61583)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Répercussions des successions sur les marchés hypothécaires et de l'habitation au Canada au cours de la prochaine décennie.

MACROECONOMIC IMPACTS OF THE HOUSING SECTOR

This study presents a series of simulations investigating the macroeconomic impacts of a two-year, temporary increase in housing construction activity. The simulations were conducted with the FOCUS macroeconometric model, built and maintained at the Institute for Policy Analysis, University of Toronto.

The central section of the study presents simulation results for 16 separate simulations. These simulations consider all the possible combinations of four basic two-way choices or assumptions: new construction versus alterations, high versus low growth in the underlying economy, historically observed versus observed-times-two import propensities in the construction sector, and monetary policy aimed at stabilizing interest rates versus monetary policy aimed at stabilizing exchange rates.

The simulations show that a temporary increase in housing activity can have important induced effects on the economy, and that stimulus of this sort could be used as a tool of countercyclical policy during a slump or recession. Stimulus takes up to a year to gather momentum and can persist for a year or more after the stimulus is removed. The simulations also indicate that a temporary housing stimulus of this kind develops its own contractionary aftershock within 3 to 4 years (or somewhat longer under interest-rate targeting).

The simulations indicate small differences in impacts when new construction is compared to alterations. Doubling import propensities in construction naturally scales down the expansionary impact of construction activity, since expenditure leakages in the form of imported building materials are greater. The choice of interest rate and exchange rate control has little effect on the short-term impacts of the cases, but do produce more pronounced differences over the longer term. Assumptions about the state of the economy have little impact on the simulation results.

Prepared by Informetrica Limited. Analysis and Simulations: Geoff Bromfield; Report: Carl Sonnen. CMHC Project Officer: Orlando Manti. Prepared for Research Division, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

RENTER TO BUYER: CMHC'S 27-YEAR HISTORICAL AFFORDABILITY REPORT 1970-1997

This report is a special edition of CMHC's Canadian Housing Markets (CHM) report. Every year, the third quarter edition of CHM contains a detailed analysis of affordability for all major urban markets. In CHM, indicators are published for the latest three reporting periods. This report compiles and analyses the new information for the indicators for reporting periods back to 1970.

The purpose of this special edition is to provide housing industry participants with analyses of long-term affordability trends in Canada's major urban centres as they relate to home ownership.

Here is a unique examination of housing affordability patterns in 27 major housing markets, or census metropolitan areas, for the past 27 years. It includes a detailed time-series analysis of affordability trends and their major fluctuations, plus a comprehensive national overview of each of Canada's major local markets.

Both the national overview and a three-page report for each urban centre identify and analyse the forces that influence affordability. Together they succinctly describe the impact of changes in house prices, property taxes, heating costs, mortgage rates and renter incomes.

The analysis includes special tabulations on the demographic forces that influence local housing markets. Each local market report includes data on the number of households by tenure (renters aged between 20 and 44, all renters and all home owners). These are available for the Census years 1971, 1981, 1986 and 1991. All are based on 1986 Census boundaries.

Finally, each section examines the availability of new and resale housing that is priced with the means of average renters.

The report is in two parts. Part I is a national overview of local market affordability. Part II contains affordability reports for each of the country's 27 major housing markets. Both parts present insightful analysis of the forces that influence affordability, succinctly describing the impact of changes in house prices, and renter incomes.

The information for 1970 and annual data in the 1980s up to 1989 has never been released before.

Ottawa: Canada Mortgage and Housing Corporation, 1998.

Order number: NHA 2154 (61912) **Price $39.95 + GST and handling charges.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : De locataire à acheteur.

FEASIBILITY STUDY FOR A SURVEY OF CONSUMER INTENTIONS TO BUY OR RENOVATE

Canada Mortgage and Housing Corporation (CMHC) client surveys have identified the need to increase the quality and timeliness of information about the intentions to purchase a home or to undertake renovations. A consumer intentions survey could provide CMHC and its clientele with a short-term indicator of local housing activity, and give important insights into the following questions:

- Are there differences between the purchase intentions of first-time and repeat buyers?
- What size of home are purchasers looking for? How much are they looking to spend?
- Why are people choosing to buy or renovate? Why are people *not* choosing to buy or renovate? Are decisions related to the economic conditions, or lifestyle choices and preferences?

This research looks at the feasibility and cost for a survey instrument that addresses these key issues and objectives.

The study involved two components:

1. an analysis of the literature on the relationships among consumer intentions, confidence, and purchase activity, and
2. the design and pre-test of a questionnaire as the basis for determining the feasibility of a program to track consumer intentions with respect to housing. The literature review provided the theoretical and conceptual context for the pre-test instrument; the pre-test itself provided information about the costs and effectiveness of the proposed instrument.

After reviewing a series of methodological options, the authors conclude that a telephone survey represents the most cost effective way for CMHC to undertake a study of housing intentions. The methodology is akin to that used in the University of Michigan Survey Research Centre on its Index of Consumer Sentiment. They have proposed a sample questionnaire (Appendix A) that has already been pre-tested for question phrasing and flow. The questionnaire collects a range of information about respondents' housing intentions and the reasons for these intentions.

Large sample sizes will be needed to generate statistically valid information for the sample groups that CMHC has identified. This raises the cost of the study accordingly. However, the quality of information generated is also much improved. Factors such as the precision, frequency, and resolution of the survey must be weighed in determining business feasibility.

Prepared by Prairie Research Associates. Prepared for Market Analysis Centre, Canada Mortgage and Housing Corporation. CMHC Project Managers: Greg Goy, Terry Petherick, Tim Gross, Ali Manouchehri. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre,

NOTE : Aussi disponible en français sous le titre : Étude de faisabilité pour une enquête sur les intentions d'achat ou de rénovation des consommateurs.

HOUSING SURVEYS

HOUSING INTENTIONS SURVEYS OTTAWA-CARLETON, 1998

The Corporate Research Group Ltd. was commissioned by the Canada Mortgage and Housing Corporation (CMHC) to conduct surveys with owner and renter households in Ottawa-Carleton.

The objective of the surveys was to identify "Housing Intentions" of a cross section of owner and renter households, in the Ottawa-Carleton Region. More specifically, to gauge future housing plans of local residents and to obtain a variety of housing and economic related information including respondents expectations for the coming year.

All surveys were conducted by telephone, using trained bilingual staff, during November 1998, and from the Nepean offices of the Corporate Research Group Ltd. Renter households participating in the survey were selected at random. Owner households consisted exclusively of those attempting to sell their homes and were identified using various means.

The main highlights of the survey, a copy of the survey instruments, the detailed findings and the statistical tables and graphs are presented. A summary of the survey results was delivered during CMHC's Housing Outlook Conference, held in Ottawa, Monday November 30, 1998.

Prepared by The Corporate Research Group Ltd. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Novak Jankovic. Ottawa: CMHC, 1998.

** Price: $50.00 + GST and handling charges

AVAILABILITY: Canadian Housing Information Centre

INDOOR ENVIRONMENT

ASSESSMENT OF THE INDOOR AIR QUALITY OF A SUITE FOR AN ENVIRONMENTALLY HYPERSENSITIVE OCCUPANT

This project analyzes and documents the findings of a comparative case study between an environmentally hypersensitive (EH) suite and a conventional suite in a newly constructed apartment building, located in Victoria, BC. This report documents the design and construction of the EH unit, and how it differs from a conventional unit in the same building. The indoor air quality of the EH unit was monitored and compared with that of the conventional unit and the outdoor air quality. Analysis was conducted once prior to occupancy and twice after occupancy of the units. An interview with the occupant of the EH unit was conducted to document the tenant's satisfaction and compatibility with the unit.

There was considerable effort made in designing the EH suite, and for the most part, the suite works well. Although improvements could be made in the design of the EH suite, the most significant improvements in design could be in how the suite might be incorporated in the larger design of the apartment block in order to promote integration of the occupant without compromising the occupant's health.

VOC's, formaldehyde, mold, dust and air change effectiveness were measured and compared between the EH suite and the conventional suite. The measurements showed lower formaldehyde levels and higher ventilation rates in the EH suite. The EH suite was less leaky in terms of air tightness. The results of the TVOC measurements were not definitive. Further measurements are needed to ascertain if chemical contaminants are being brought into the unit.

The EH suite at the Selkirke Apartments provides the occupant with an indoor air quality that is incrementally better than her previous accommodation. While the situation is by no means perfect for the occupant, she is coping better with her condition. If one uses the criteria of incremental improvements in order to assess the success of the EH suite, one may conclude that it is successful.

Prepared by Sheltair Scientific Ltd. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: Virginia Salares. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

CURBING COCKROACHES THE LEAST-TOXIC WAY: A PRACTICAL GUIDE FOR THE CONTROL OF COCKROACHES IN HOUSES AND APARTMENT BUILDINGS

This handbook is a resouce manual for anyone who needs to understand and teach others how our homes and apartment buildings become infested with cockroaches; why pesticide spraying alone is not an effective remedy; and why the best solution - Integrated Pest Management (IPM) - is the least-toxic one. It provides the background information that community health workers, environmentalists, landlords, tenant association leaders, tenants and homeowners need to educate themselves and others about cockroach control. It offers hands-on, practical information on how to carry out an IPM program against cockroaches.

The handbook is divided into five parts:

- A Cockroach Crash Course;
- The Pesticide Treadmill;
- Cockroach Control the IPM Way;
- Using Pesticides; and
- Promoting IPM for Cockroach Control in Your Community.

Information Sources lists the publications used to produce this handbook. The Appendices provide promotional hand-out sheets and visual aids.

Prepared by: Linda Pim and Monica Campbell. Funded by Canada Mortgage and Housing Corporation and the Ontario Ministry of Environment. Ottawa: CMHC, 1998. 69 pages.

Order number: NE2047 (60949)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : L'extermination des coquerelles de la façon la moins toxique.

EVALUATION OF POLLUTANT SOURCE STRENGTHS AND CONTROL STRATEGIES IN AN INNOVATIVE RESIDENTIAL HIGH-RISE BUILDING

A research project was undertaken to examine the relationships between indoor air quality, building material pollutant emissions, and occupant activities in a multi-unit residential building. The main objectives of the study were to enhance the understanding of the relative contributions of building-related pollutant sources versus occupant related sources and to characterize the impact of source control and source dilution/venting strategies. The study determined that the concentration of volatile organic compounds (VOC) within the indoor air generally tended to decrease from the time of construction completion through to a period 8 months post-occupancy. Emissions from building materials and finishes dominate the overall emission loading within the apartments only during the pre- and immediate post-occupancy periods. Occupant-related pollutant sources such as furnishing, finishes and activities tend to dominate the overall pollutant concentration levels at later times. VOC concentrations in all apartments were found to exceed accepted guidelines. Formaldehyde emissions from building materials were the dominant source of total formaldehyde concentrations within the apartments for both the pre- and post-occupancy periods. Formaldehyde concentrations were generally below the Health Canada guidelines for new homes.

Ventilation rates within the apartments did not appear to have a significant impact on indoor concentrations of volatile organic compounds and formaldehyde indicating that ventilation alone cannot be expected to control pollutant levels. Careful selection and use of low or non-polluting building materials would be a more appropriate means of optimizing indoor air quality. Furthermore, occupant education concerning their selection and use of low and non-polluting furnishings, finishes, cleaning compounds and other materials would be required to prevent occupant related sources from continuing to pollute the indoor air as the influence of building related materials decrease over time.

Prepared by SIRICON. SIRICON Project Manager: Dino Gerbasi. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: Duncan Hill. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

EVALUATION OF THE BARRHAVEN MULTI-UNIT HOUSING PROJECT FOR THE ENVIRONMENTALLY HYPERSENSITIVE

This survey of the occupants and the landlord of a Barrhaven (Nepean, Ontario) housing project for the environmentally hypersensitive assessed whether the occupants' needs are being met and what advantages or limitations are encountered with this type of housing. For the most part, the occupants expressed satisfaction with their units. Lighting and aesthetics were considerations in addition to air quality which the occupants found very important. This study is helpful for others who are planning similar projects.

Prepared by the Flett Consulting Group Inc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Virginia Salares. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

INDOOR ENVIRONMENT

FAREWELL TO COCKROACHES: GETTING RID OF COCKROACHES THE LEAST TOXIC WAY

This publication describes the IPM - Integrated Pest Management - approach to controlling cockroaches or any insect. IPM is an approach that works, without using pesticides that can harm your health and your family's health. Homeowners, apartment dwellers, and property managers can follow the five step approach in the booklet to control cockroaches. *Farewell to Cockroaches* gives you the benefit of the knowledge and experience of health professionals so you can control cockroaches - or any insect pest - quickly and effectively.

Ottawa: Canada Mortgage and Housing Corporation, 1998. 25 pages.

Order number: NHA 2045 (60948)

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Adieu coquerelles! Comment se débarrasser des coquerelles de la façon la moins toxique.

HOUSING NEEDS OF THE ENVIRONMENTALLY HYPERSENSITIVE: SOCIO-ECONOMIC/HEALTH FACTORS: FINAL REPORT

This study surveyed the housing needs of 200 environmentally hypersensitive individuals in Canada. The survey gathered information related to the socio-economic characteristics of this group and their current housing situation, needs and preferences. The results are used to discuss the market potential for clean air housing, the long-term social and economic implications of being afflicted with environmental hypersensitivity and program, education and research issues that would be helpful in their housing.

Prepared by Ekos Research Associates Inc. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: Virginia Salares. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

MANUFACTURED HOUSING

MANUFACTURED HOUSING: CREATING COMMUNITIES

This short video was produced by the Canadian Manufactured Housing Institute with guidance from CMHC's Research Division and with financial support from CMHC. The goal of the video is to increase the range of housing choices available to Canadians. Featuring homes and communities from coast to coast, housing that provides lifestyle choices in land lease communities is visually demonstrated in this twelve minute video.

Incorporating affordable housing choices has become a real challenge for today's planners and officials. No longer sponsored by government agencies, the continuing supply of affordable housing options becomes the responsibility of local government officials and the private sector. Manufactured housing is ideally positioned to provide affordable housing choices in a quality home product.

MANUFACTURED HOUSING

Primarily an educational tool, this video encourages planners and zoning officials to explore affordable housing options by including manufactured housing communities in municipal and rural plans. Visual displays of successful communities, combined with standard models, testimonials from planners, developers and home buyers will dispel the myths and prejudices surrounding manufactured housing communities today.

Additional target audiences include developers, financial institutions, and government agencies.

Ottawa: Canadian Manufactured Housing Institute, 1998.

Price: $10.00

AVAILABILITY: Canadian Manufactured Housing Institute
500 - 150 Laurier Avenue West
Ottawa, Ontario K1P 5J4
Tel.: 613-563-3520 Fax.: 613-232-8600
Email: cmhi@cmhi.ca

NOTE : Disponible aussi en français sous le titre : Habitation usinée : pour créer des communautés.

"RORO" MODULAR HOME SHIPPING SYSTEM

This report discusses the potential use of RORO vessels as a shipping system for exporting modular housing components to Japan. The work looks at the modular concept, compares its costs to the more traditional panelized housing export product, estimates a potential market and discusses the system's advantage.

As one of the core elements in the report, the chapter on shipping encompasses four major sections. Section one discusses the various regulatory, industry and practical size limitations which will impact any proposed module or associated shipping system. Section two looks at various shipping options from modern containerization to traditional break-bulk cargoes. It explains the physical and operational environments one will find at the various port facilities and on the vessels themselves. The third section integrates the findings arising from the first two parts and proposes alternate methodologies and equipment for transporting modules either from plants within an hour of the port of export or from intermediate distances ranging up to 300-400 km. The final section compares the costs of shipping two identical homes to a common construction site in Japan. One home is a panelized structure and finishing materials which are loaded into two 40' containers, while the other home is a six module residence wherein the modules are equipped to be towed on their own wheel assemblies.

The report also reviews modular design as well as its technical requirements and attributes. It discusses various functional requirements, cultural attributes and some simple design options whose use can significantly improve on the somewhat boxy appearance which plagues many other modular homes. There is also an extensive discussion of technical issues such as structural anchors, inter-module connectors, joint finishing between modules, fire safety and environmental or envelope integrity. In addition, a detailed comparison is made of the differences in the costs associated with producing competing panelized and modular systems in a Canadian plant and then assembling the materials into identical homes in Japan.

MANUFACTURED HOUSING

Prepared by Ian Bazley. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Don Hazleden. Ottawa: CMHC, 1997 (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

MOISTURE AND MOLD

ATTIC VENTING, ATTIC MOISTURE, AND ICE DAMS. ABOUT YOUR HOUSE; CE13

This informative factsheet tells the homeowner what to do if water is coming through the ceiling, if they have a wet attic or ice damming. It explains what they may expect to see in the attic and includes handy illustrations, tips on where to look for leaks and what to use to seal them. The article also recommends useful publications, web sites and alternate sources of information.

This handy article guides the homeowner through the steps for problem identification and presents solutions, in a friendly, easy-to-read format.

The primary audience is homeowners, but it may be of interest to property managers, municipalities, emergency planners, inspectors, etc.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: 62034

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Ventilation du vide sous toit, humidité dans le vide sous toit et formation de barrières de glace.

MOISTURE IN STRAW BALE HOUSING: NOVA SCOTIA: FINAL REPORT

Given the use of straw bales as building materials in several houses in the Atlantic Canada region over the past few years, the investigators saw a need to test and monitor the performance of these houses vis a vis moisture issues. The two main areas of interest in this study were: to test the 'breathability' of straw bale walls finished with a cement-based stucco on interior and exterior surfaces; and to monitor for one year the moisture content in straw bale walls in occupied houses in the region.

Four houses in Nova Scotia were chosen for the study. Each house differs in construction and finish technique, as well as in the attention paid to air sealing techniques and roof/ceiling/floor insulation for energy efficiency. However, all four houses feature straw bale walls finished with a cement based stucco (one with a soil-cement stucco, the other three with a conventional three coat cement stucco).

'Breathability' was tested by using the CGSB standard for air tightness testing and the Minneapolis Blower Door Apparatus, as used on housing of all types and ages. The results of this test indicate how many times the volume of air within the building envelope changes at an induced pressure of 50Pa. This result is commonly used to gauge how 'leaky' any given house is, and also to discover the areas where the air leakage occurs. In all of the houses in the study, air leakage was found in the same areas as is typical to stick-frame construction of any vintage (to a greater or lesser degree): joist/header areas, wall/ceiling junction, penetrations through ceilings and walls, and incomplete air sealing at door and window frames. In the house with the lowest air test result (3.13ACH), the owner/builders had paid particular attention to air sealing in such areas as the wall/ceiling junction, the potlight and plumbing penetrations into the attic space and the spaces between the window units and the rough openings. Although this air test does not definitively prove or disprove claims of 'breathable' cement-based stuccoed straw bale walls, it does prove that air sealing techniques can be applied to any building media.

The results of the monitoring program indicate that the four houses tested have seasonal swings in moisture content, but apart from a few instances of actual water leakage into the walls (due to a leaky pipe in one case and a leaky roof in another), the average moisture content in the walls swings from readings of 6.8% in December/January to 12.2% in July, well under the 20% MC thought to be the threshold for structural and healthful damage to straw bale walls. These results auger well for those who wish to build with straw bale in this region where moisture issues due to climate can be problematic in the built environment.

Prepared by S.H.E. Consultants, Shawna Henderson, Principal Investigator. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Don Fugler. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Humidité dans les maisons en bottes de paille, Nouvelle-Écosse.

PROTECTING GYPSUM SHEATHING IN INSULATED STEEL STUD WALLS

A potential loss of strength and the growth of mould and mildew are two of the problems resulting from moisture accumulation in exterior gypsum sheathing. The purpose of this research was to examine methods of protecting various insulated steel stud and exterior gypsum wall systems when exposed to condensation conditions. To fulfil this purpose, eighteen different wall panels were exposed to laboratory-controlled, freezing and non-freezing temperatures and 100% relative humidity conditions at the exterior gypsum sheathing surface. The test panels varied according to the type of warm-side protection on the gypsum sheathing (unprotected, SBPO, or polyethylene) and according to six different assemblies of cold-side materials.

Numerical analyses were carried out using a finite difference package to assist in determining the necessary test duration by finding the time required for the gypsum sheathing to approach a steady-state moisture condition.

The results from the test panels were compared on the basis of moisture content and percentage moisture distribution in each wall component. The final moisture content of the gypsum sheathing in each test showed that SBPO and polyethylene are very effective at reducing the amount of moisture absorbed by the gypsum sheathing. Polyethylene was the most effective at reducing the amount of moisture accumulating in the sheathing, as well as reducing the amount of moisture diffusing through the wall. Theoretical test panel results from numerical analyses compared favourably with the laboratory test results.

The use of protective barriers resulted in the accumulation of moisture in the warm-side batt insulation. Under freezing conditions, a layer of ice formed on the warm side of the gypsum. During non-freezing tests, most of the moisture was either absorbed by the sheathing (unprotected panels) or accumulated in the warm-side insulation. Thus, the use of protective layers in practice will require the development of designs which allow for the removal of this accumulated moisture.

The results of preliminary field trials of two full-scale walls are also included in the report. Two wall samples, one unprotected and one SBPO protected, were exposed to actual weather conditions on their exterior face from November 1994 to February 1995 in Calgary, Alberta. Two-dimensional heat flow in a vertical cavity and gaps between the protective layer and gypsum sheathing may have affected the amount and location of moisture accumulation in the wall samples. Generally, results from the full-scale field tests were not as promising as the laboratory and theoretical studies. The moisture content in the SBPO protected gypsum sheating was higher than expected, and occasionally approached the moisture content values of the unprotected gypsum sheathing.

It is clear that SBPO and polyethylene can be used to protect exterior gypsum sheathing from moisture. The use of protective layers can improve wall performance when condensation, due to either air leakage or diffusion, occurs at the exterior gypsum sheathing. However, further work is necessary to find ways to efficiently remove water which may accumulate in the stud cavity under severe exposure conditions.

Prepared by K.D. Pressnail ... et al. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: Jacques Rousseau. Ottawa: CMHC, 1997. (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

REMOVING ICE ON ROOFS. ABOUT YOUR HOUSE; CE15

The ice storm that hit eastern Canada in January 1998 provided many cases on which to research the removal of ice accumulation on roofs. This factsheet identifies what to do in an ice storm emergency, explains how to tell when there is a problem with both sloped and flat roofs, and the best methods for ice removal. The article also identifies those methods which had no or only moderate success. Heavy emphasis is placed on personal safety, and the recommendation to leave the work in the hands of the professionals.

This article provides the homeowner with valuable information about the removal of ice, in an easy to read format. The primary audience is homeowners. It may also be of interest to property managers, municipalities, emergency planners, inspectors etc.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: 62036

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : L'enlèvement de la glace sur les toitures.

A STUDY OF RECURRING MOLD PROBLEMS ON THE ROSEAU RIVER RESERVE, MANITOBA

The Roseau River Anishinabe First Nation Reserve in southern Manitoba was evacuated from April 23, 1997 to May 22, 1997 due to flooding of the Red River. Although most of the 204 homes are surrounded by a dike, some flooding did occur. That flooding was almost exclusively limited to basement seepage below grade, along with some sewage back-up. Although the basements were cleaned and, in some cases, renovated, recurring mold continues to be a problem. Of more than 114 homes that were flood damaged, at least 34 have been identified as contaminated with *Stachybotrys chartarum* (also known as *Stachybotrys atra),* a dangerous mold. At least 53 other homes have been identified as contaminated with various other molds.

The purpose of this report was to investigate the recurring mold problems at the Roseau River Reserve through a sample study of eight homes both inside and outside the dike, using the Canada Mortgage and Housing Corporation *Indoor Air Quality Investigative Protocol.* Eight houses had suffered basement seepage or flooding. Four of those had previously been identified as contaminated with *Stachybotrys chartarum* while two others had been previously identified as contaminated with other molds.

Recommendations for each of the eight homes, for other homes in the community, for home occupants and for new construction are included in this report. A shift in focus is offered in the recommendations.

That shift includes insulation of existing basements on the exterior; provision of new shallow crawlspace foundations for some houses; installation of better mechanical ventilation; and development of a model construction and inspection standard for new construction. It is recommended that any new homes be energy efficient slab-on-grade bungalows; suitable for the high occupancy rate, poor drainage and cold climate of this community.

Prepared by Bill Boles, Boles Construction. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Virginia Salares. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

CHATTEL LOAN INSURANCE PROGRAM: EVALUATION REPORT

This is the final report on the evaluation of the Chattel Loan Insurance Program (CLIP). The Chattel Loan Insurance Program, implemented in September 1988 for a five-year trial period, provided mortgage insurance on loans used to purchase manufactured housing located on land that was rented on a short term basis. CLIP was designed to improve access to affordable housing. CLIP facilitated the financing of mobile homes and in doing so began to place mobile homes on an equal footing with conventionally built houses.

CMHC was required to evaluate this program after the five-year experimental period. This report addresses the key findings and conclusions of the evaluation. The evaluation team found that there was both a need and a rationale for the program. The program met its objectives, albeit program take-up was limited. Other program impacts and effects were found to be mainly positive. The evaluation team found that regularizing the program and removing some of the restrictions placed on it would be beneficial in most cases.

Prepared by: Audit and Evaluation Services, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Aussi disponible en français sous le titre : Programme d'assurance des prêts pour logements transportables : rapport d'évaluation.

EXAMINATION OF THE PROSPECTS FOR, AND POTENTIAL IMPACTS OF REAL ESTATE INVESTMENT TRUSTS ON THE MULTI-FAMILY RENTAL MARKET IN CANADA

A Real Estate Investment Trust (REIT) is a tax advantaged investment vehicle set up to own and manage real estate. REITs raise money through publicly listed partnership units (Canada) or through shares (U.S.).

REITs have shown phenomenal growth in the U.S. in recent years. REITs focusing on residential apartments in the U.S. now hold a total of around 1 million rental units. The Canadian REIT industry is very small in comparison. The first two Canadian REITs focusing on residential apartment properties were formed in 1997.

The purpose of this paper is to explore whether the U.S. pattern of REIT growth is likely to be followed in Canada and to assess whether REITs represent a financing mechanism which can improve rental affordability and the financial viability of regenerating or constructing residential rental units in Canada.

The report concludes that use of the REIT structure in the U.S. has enabled real estate operators and developers to achieve greater access to capital, and lower cost financing for acquisition, construction and renovation. The resulting ability to grow has also enabled them to achieve economies of scale in purchasing, marketing and operations.

The lower costs and greater availability of capital has reduced cost pressure on rents for existing owners and enabled projects (including renovation) to go ahead, thereby increasing supply and further moderating pressure on market rents.

REITs could assist in revitalizing the Canadian rental sector by drawing additional players and a new source of funding into the market, and contributing to upgrading the stock particularly in areas where renovation has been discouraged through rent controls.

The potential for REITs in Canada, however, is limited by legislative and regulatory factors. In addition, a number of market and economic factors are not as conducive to REITs obtaining the competitive advantages that they enjoy in the U.S.

Prepared by Tony Wellman. CMHC Project Officer: David Metzek. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

FEASIBILITY STUDY ON THE COMMERCIAL VIABILITY OF LAND-ONLY MORTGAGE LOAN INSURANCE

Canada Mortgage and Housing Corporation (CMHC) is interested in assessing the commercial viability of land-only mortgage loan insurance, which is generally not available in the marketplace today. Land-only mortgage loan insurance is defined as insurance protection to obtain financing to acquire and/or service land for housing related purposes.

The purpose of this study was to enable CMHC to better assess the potential demand for land-only mortgage loan insurance, the risk to CMHC in offering land-only mortgage insurance and what means are available to CMHC to mitigate associated risks.

Through questionnaires and face-to-face interviews, data was collected to permit the analysis of the critical success and failure factors and to identify financing gaps in the land development process. This information set the framework within which the insurance parameters were subsequently developed. Specific areas within two provinces were selected for analysis; one where there is a high degree of housing market activity and where land prices can be volatile (the Greater Toronto Area of Ontario) and one with a relatively stable housing market activity (the Winnipeg Region of Manitoba).

Ottawa: Canada Mortgage and Housing Corporation, 1998.

AVAILABILITY: Canadian Housing Information Centre

INVESTIGATION INTO THE CAUSES OF RISING MORTGAGE DEBT AND IMPLICATIONS ON THE MORTGAGE MARKET

This study looks at the rising level of mortgage debt in Canada and its implications. The Bank of Canada has noted, with some concern, the rising level of household debt in general and mortgage debt in particular. CMHC has attributed the rise in the latter to mortgages on other than primary residences, and has pointed out that aggregate trends do not take into account the correlation between debts and corresponding assets. By the same token, the National Housing Act (NHA) was changed in 1992 to allow residential mortgages of 95 per cent of the lending value, and first-time owners are allowed to use some of their Registered Retirement Savings Plan (RRSP) funds. These changes should have increased the aggregate demand for mortgage loans. This study extricates the statistical evidence related to growth in mortgage debt and interprets what the trends are indicating.

MORTAGES AND HOUSING FINANCE

The study found:

- Despite the rising level of consumer debt, the state of the household balance sheet, on a national accounts basis, is wrong.
- The rising level of consumer debt is principally due to a rising level of mortgage debt, almost exclusively loans by the chartered banks. However, included in the mortgage debt numbers is an unknown quantity, which represents rental properties, cottages, nursing homes, retirement communities and other non-primary residences. A conservative estimate of these portions, taken together, would be approximately one third, in line with the tenure breakdown of the housing stock.
- Despite the use of an estimate of household mortgage indebtedness inflated by mortgages on properties other than principal residences, the mortgage loans outstanding remain well secured by the housing wealth of the country, which continues to rise, albeit at a more modest pace that in previous decades.
- At the household level, using data from the FAMEX from 1982 to 1992, there is no evidence that households have become appreciably more mortgage-indebted over that period. The 1996 survey, when it becomes available, will show the effect of the program-driven, high-ratio mortgages on the overall picture.
- According to industry sources interviewed for this study, credit, is to some extent, supply-enabled, in the sense that the availability of credit and its terms and conditions help shape the debt load assumed by individuals and households.
- There is no evidence of a direct link between high aggregate mortgage debt and the rising level of bankruptcy. Homebuyers who go bankrupt are most likely to be first-time buyers with unresolved debt management issues.
- Finally some portion of the growth in aggregate debt could be expected given the underlying demographics - the baby boom generation has been moving through its peak borrowing years. As this group moves into its saving period, a smaller group will replace it. At the same time, the baby boom generation also stands to inherit a substantial amount of wealth from its prewar parents' generation. The conjuncture of these elements should mean that the high consumer debt will start to decrease.

Prepared by the Corporate Research Group Ltd. in association with Fuller Information and Jacobson Consulting Limited. Ottawa: Canada Mortgage and Housing Corporation, 1999.

AVAILABILITY: Canadian Housing Information Centre

PERSONS WITH DISABILITIES

ADAPTING LOW-RISE RESIDENTIAL BUILDINGS

Most walk-up apartment buildings constructed during the 1970s, 1980s and 1990s were not required by the building code to be barrier-free. However, the number of people with mobility, sight or hearing impairment is growing as our society ages, and the availability of suitable accommodation is limited. Recognizing this changing market, the Multi-family Council of the Saskatoon Home Builders' recommended the preparation of a manual to assist building owners and managers to make barrier-free renovation decisions. The Canada Mortgage and Housing Corporation has developed the Low-Rise Residential Barrier-Free Guide with the assistance of many professionals and organizations.

This guide has been designed to satisfy two needs. First, it identifies renovations that will create a barrier-free, three-storey walk-up apartment building. Second, it provides decision-making tools to help building owners and managers determine occupants' requirements, building suitability and the extent of renovations required to create a barrier-free living environment.

The first six chapters identify accessibility barriers that are common to three-storey walk-up apartment buildings. Modifications are suggested to remove or minimize these barriers. The chapter "Assessment Tools" identifies the basic level of service for tenants in each occupant group.

The "Looking Ahead" section at the end of each chapter provides renovation options that can be undertaken at the same time as regular maintenance activities. These low-cost options will make the building more accessible and livable for current and future occupants.

Prepared by: Sun Ridge Group (Saskatoon) for Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.

Order number: PE0292 (61577)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Adaptation des bâtiments résidentiels de faible hauteur.

EVALUATION OF HOUSING INITIATIVES UNDER THE NATIONAL STRATEGY FOR THE INTEGRATION OF PERSONS WITH DISABILITIES

This is the final report from the evaluation study of CMHC'S activities under the National Strategy for the Integration of Persons with Disabilities over the 1991 to 1995 period.

The National Strategy for the Integration of Persons with Disabilities (NSIPD) was a five year federal program announced in 1991 to enhance the participation of persons with disabilities in the social and economic main stream of Canadian society. CMHC undertook two main activities in support of the National Strategy. The $10.M Home Adaptation for Seniors Independence (HASI) pilot program was to assist seniors with diminishing abilities to continue living independently in their homes and a $3.2 M research and demonstration initiative was to develop design and construction solutions to improve the living conditions of all persons with disabilities. The HASI Program has been subsequently renewed and CMHC continues to conduct research and demonstration activities to improve the living conditions of persons with disabilities.

Key Findings and Conclusions - HASI Program

The evaluation team found that the program addressed a need. There was a very high proportion of low income seniors with disabilities who wished to remain at home. The Team also found that the program was logically designed to achieve its objectives of providing equal access to housing for persons with disabilities and that the program had the potential to reduce long term health care costs.

The HASI program was found to be well targeted to low income seniors with age related disabilities. Home modifications financed by the Program improved the comfort, safety and quality of life of clients and allowed as many as one third of them to pursue an independent life style at home rather that having to move to a care facility. Over fifty percent of clients made the minor adaptations to their homes only because of the financial assistance available under HASI, while the balance would have made the modifications anyhow.

The level of assistance was generally appropriate, albeit most clients contributed their own funds to the cost of modifications and most indicated that there were additional modifications needed to their homes which they were unable to afford.

With respect to program delivery, the evaluation team found that the initial low key approach to program promotion was ineffective in generating clients for the program, although subsequent efforts to increase take up were successful. It found that clients were satisfied with most aspects of the application and approval process, although there was some evidence that the forms could have been simplified.

The vast majority of clients reported no problems during the process of hiring professional renovators to do the work. The evaluation team found that the HASI Program was cost effective. The total cost of the Program was offset by the cost savings realised by society as a result of the 32 percent of clients being permitted to remain at home for a year or longer rather than having to move to a care facility.

Key Findings and Conclusions - Research and Demonstration Initiatives.

The evaluation team found that there was a need for information in the area of housing persons with disabilities and that CMHC, as the federal government housing agency, was in an excellent position to carry out this work. The evaluation team found that CMHC was successful in increasing awareness of the housing needs of persons with disabilities and that the information led some to make home modifications. It concluded that CMHC's research and information projects can be expected to have important impacts on the quality of housing in the area of housing for persons with disabilities. CMHC's publications in the area of housing persons with disabilities were relevant, of high quality and timely. But many did not know that they existed. Some felt that the information should also be available through on-line computer access and in a CD ROM format.

Prepared by Audit and Evaluation Services, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Évaluation des initiatives de logement dans le cadre de la Stratégie nationale pour l'intégration des personnes handicapées.

EXAMINATION OF THE SUPPORTIVE HOUSING NEEDS OF THE SERIOUSLY MENTALLY ILL IN THE MANITOULIN-SUDBURY DISTRICTS

This External Research study aimed to explore and specify the supportive housing needs, preferences and choices of adults with serious mental illnesses, and in particular to identify similarities and differences among subgroups of this "SMI" population along the lines of geographic location, language/culture, and gender. The study was undertaken in the Manitoulin-Sudbury area of Ontario, where community locales range from urban to rural and remote, and significant proportions of the population are anglophone, francophone and Aboriginal, respectively. One hundred mental health services consumers were interviewed from across the region, plus a cross-section of mental health services providers and representatives of consumer/family support groups. Results indicated that there is a need for supportive housing among all SMI population subgroups regardless of geography, language/culture or gender. The most notable difference among the subgroups was related to geography: consumers living in rural communities outside of the Sudbury district have a higher need for supportive housing because of increased isolation and lack of access to public transportation.

Variations by language/culture and gender are also noted in the report although they were not found to be statistically significant in this sample. The report concludes with a series of recommendations to address the identified supportive housing needs.

Prepared by Geneviève Gibbons, David Paquette. CMHC Project Officer: Teresa van den Boogaard. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

HOUSING DESIGN NEEDS OF DEAF PEOPLE

This report examines the literature and other resources and documents and summarizes the current level of information on the housing design needs of deaf persons, and includes an annotated bibliography on this topic. The information examined is summarized to isolate significant factors of concern. Recommendations are made for further courses of action or areas in need of more investigation.

In preparing this report the literature in regards to the deaf and that in regards to barrier free design was searched. The legislation regarding barrier free design was consulted. Resources on the Internet were searched under the topics of "deaf" and "barrier free design" and related topics and likely looking "hits" were "surfed". People and associations who would be likely to have information were contacted.

Deaf people, for the most part, live in homes designed for the general population. Adaptations are made to meet their unique needs. Homes that are designed specifically with the needs of the deaf in mind are not common.

Prepared by Henry Vlug, Canadian Association of the Deaf. Prepared for Canada Mortgage and Housing Corporation. CMHC Project Officer: Tom Parker. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Les besoins des sourdes en matière de conception de logements.

PERSONS WITH DISABILITIES

NARRATIVES ON DEDICATED MIXED AND INTEGRATED HOUSING

It is widely acknowledged that the key components of any comprehensive community support and rehabilitative approach for consumers of psychiatric services include decent, stable housing and the availability of a wide variety of supports. There has been growing evidence that mental health consumers' perceptions of what they need in a living environment are the best predictors of success in housing. The objective of this study was to examine mental health consumer and mental health provider preferences for and perceptions of three housing types: dedicated, mixed and integrated housing. Forty-five interviews were conducted with consumers of mental health services living in each of the three types of housing and 24 interviews were conducted with mental health providers.

The results of this study indicate that mental health consumers have varied needs and preferences for housing and that the availability of a wide range of housing choices is important to both mental health consumers and service providers.

Prepared by: K.M. Boydell, B.M. Gladstone, E.K. Crawford, J. Trainor. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 1998 (CMHC External Research Program).

AVAILABILITY: Canadian Housing Information Centre

QUALITY OF LIFE

QUALITY OF LIFE INDICATORS: A PILOT TEST OF THE COMMUNITY ORIENTED MODEL OF THE LIVED ENVIRONMENT

The purpose of this study was to conduct a pilot test of the Community Oriented Model of the Lived Environment (COMLE). COMLE provides an approach for applying 40 quality of life indicators in municipalities, and makes a direct link between quality of life and urban sustainability. The first version of COMLE was produced in 1992 and successfully tested in 1993 by three Canadian municipalities - Quebec City, Toronto and Fort McMurray. Subsequently, COMLE was used in 1995 for a major study on quality of life in the Greater Toronto Area (GTA). This report presents the results and lessons learned from the 1993 pilot test.

The report describes the parameters of the pilot test, and summarizes the experiences of the participating municipalities (their full reports are in the appendices). The primary objective of the test was to have practitioners in municipal government evaluate the model under normal working conditions. The test lasted about 13 weeks and required the equivalent of just over one month of staff time. Each city made a unique contribution.

The test confirmed that the structure of COMLE is valid and meaningful for use at the local level. The report recommends improvements to the model, discusses its limitations, and states some conditions for its successful use. Since the model is based on objective indicators, it is necessarily incomplete and should be supplemented with qualitative information. Statistical measures require interpretation to be properly understood; therefore, users should provide context and commentary in their reports. Although the model suggests a list of indicators, users are encouraged to adapt it to individual circumstances, which means considering at the outset the nature of local issues and the audience for the resulting report.

Prepared by David H. Sherwood. Prepared for the Centre for Future Studies in Housing and Living Environments, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1996.

Order number: PE0264 (61489)

AVAILABLE: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Indicateurs de la qualité de vie : essai pilote du Modèle d'orientation communautaire de l'environnement habité (PF0264).

REGULATORY REFORM

ACT IN ACTION: AFFORDABILITY AND CHOICE TODAY -- LESSONS LEARNED: FINAL REPORT

Affordability and Choice Today (ACT) is a federally funded program that encourages municipalities and the housing sector to work in partnership to conceive, test and implement changes to the existing web of building and development regulations. The belief is that some change is necessary - even essential - to foster the development of more affordable housing and to widen the range of housing choices. This report looks at a number of projects completed under the program. It identifies elements in each that have led to positive changes. In doing so, it gives decision-makers the information they need to assess, not only the value of alternative approaches, but also their relevance and transferability to their communities.

Prepared by David Bruce. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: David Scherlowski. Ottawa, CMHC, 1998.

Order number: PE0309 (61584)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : ACT en action: Abordabilité et choix toujours: leçons apprises.

THE CITY OF YELLOWKNIFE DEVELOPMENT APPROVAL PROCESS REVIEW AND STREAMLINING : CASE STUDY = ÉTUDE ET RATIONALISATION DU PROCESSUS D'APPROBATION DES DEMANDES D'AMÉNAGEMENT DE LA VILLE DE YELLOWKNIFE : ÉTUDE DE CAS

In 1992, the City of Yellowknife, Northwest Territories, undertook a Development Approval Process Review to find out how well its method of approving and issuing building and development permits was working and where it might be improved.

Having a well-oiled approval process is desirable anywhere but is particularly important in the North. Builders there face a short construction season so delays could force them to work in winter weather or to postpone jobs until the next building season. Either alternative drives up costs and eventually makes housing and commercial space less affordable.

In June 1993, the City hired the Yellowknife consultancy firm of Ferguson, Simek, Clark (FSC) Engineers and Architects to undertake the investigative phase of the project and to make recommendations for improvements. The consultants interviewed Yellowknife civic officials who manage the approvals process, members of the public who used the system, and officials in other municipalities who could describe how their permit approval processes operated.

In general, the consultants found that Yellowknife's system worked well. When applicants understood the process - mostly because they were old hands at obtaining approvals - there were few problems. When problems occurred, it was usually due to a lack of information. Those interviewed felt it was imperative that the City publish information to help users understand how the approval process operates and what is required of them. Those interviewed also advocated various measures to improve efficiency.

As a result of the Development Approval Process Review and a coincidental amendment to its building by-law, the City of Yellowknife implemented several reforms to its permit approval process. First and foremost was the publication of six brochures that guide applicants through the approval process. Four of these brochures relate to specific types of construction while the other two are general guides to obtaining building permits and mechanical permits.

The City also eliminated the need for building permits for several types of small-scale projects and introduced administrative efficiencies. A review of the zoning by-law, still underway when this report was written in 1997, may generate additional reforms.

Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project / Department of Planning and Lands, City of Yellowknife, N.W.T. Prepared by Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa. The Federation; The Associations, CMHC, 1997.

AVAILABILITY: Canadian Housing information Centre

NOTE: Bilingual/bilingue.

CONSTRUCTION STANDARDS FOR ACCESSORY SUITES = NORMES DE CONSTRUCTION VISANT LES APPARTEMENTS ACCESSOIRES

The major task facing many urban municipalities is not one of introducing accessory suites, but rather one of converting illegal suites into legal dwelling units. The City of Saskatoon wanted to encourage its landlords to upgrade illegal suites to acceptable standards of health and safety, while helping to make the process as straightforward and economical as possible. In this way, the City would improve the quality of existing dwellings and ensure the continuing availability of affordable housing. Several other cities in Canada have undertaken regulatory reform projects regarding secondary suites and the conversion of illegal units.

The City received an A.C.T. grant in 1993 to proceed with its project, which consisted of four phases:

- ***Phase One*** -- the project team reviewed existing regulations (zoning by-law, and building and fire codes) and literature on accessory suites.
- ***Phase Two*** -- a sample of suites was inspected in an inner-city test area to determine the type and extent of violations that actually existed.
- ***Phase Three*** -- the project team assessed the City's zoning by-law requirements for accessory suites and developed an evaluation procedure to encourage compliance.
- ***Phase Four*** -- educational materials were developed (a four-page brochure, a pamphlet and a short video) to inform landlords about compliance requirements and the upgrading process.

The inspections in the second phase revealed several items typically not up to standard. The City addressed these in its educational materials. The City also emphasized its intent to ensure compliance with National Building Code (NBC) guidelines and Saskatoon's zoning by-law, while encouraging the continued presence of accessory suites.

As a result of the project, the City of Saskatoon determined that it needed to make a clear differentiation between accessory suites and other types of apartment dwellings, since the lack of distinction had proven to be confusing. The City defined an accessory suite as a second, self-contained unit in a house originally planned as a single-family dwelling. Where three or more units existed in one structure, the City treated them as apartment units that were required to comply with zoning and building code regulations relating to multiple-unit dwellings. This distinction allowed the Planning and Building Department to formulate appropriate guidelines aimed at encouraging the availability of accessory suites as a safe, affordable housing option, while recognizing their unique presence in residential neighbourhoods.

Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project / City of Saskatoon, Saskatoon, Saskatchewan. Prepared by: Energy Pathways Inc. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association and Canada Mortgage and Housing Corporation. Ottawa: The Federation: The Associations: The Corporation, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual/bilingue.

THE EVALUATION STUDY OF THE AFFORDABILITY AND CHOICE TODAY (A.C.T.) PROGRAM

The Affordability and Choice Today (ACT) Program, initiated in 1990, was designed to encourage the private and non-profit housing sectors to work in partnership with municipalities to develop, test and promote regulatory innovation that can help to improve housing affordability and choice. It addressed a complex infrastructure of bylaws, agreements, zoning, variances and standards established by local and provincial governments to protect the interests of local residents, property owners and governments. The evaluation examined whether the ACT Program continued to address an actual need (i.e. program relevance) and whether it was effective in meeting its objectives (i.e. program success). This report addresses the key findings and conclusions of the evaluation.

Prepared by Audit and Evaluation Services, Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Étude d'évaluation du programme Abordabilité et choix toujours (ACT).

"GARDEN SUITES" PILOT PROJECT: CASE STUDY = PROJET PILOTE DE PAVILLONS-JARDINS : ÉTUDE DE CAS

In 1990, Interchurch Housing Society (ICHS), a charitable non-profit organization, received an A-C-T grant to lay the groundwork for the introduction of garden suites in Kings County, Nova Scotia. To demonstrate the different regulatory requirements for urban and rural sites, it proposed to deploy two units; one in a rural setting and the other in an urban setting. The objective was to allow the community to view this form of housing and evaluate the degree of success of the project in order to set the stage for future deployments.

Interchurch met several times with the County to identify a procedure for selecting a site and approving the proposed units. Initially, the County planned to follow a development agreement approach, but decided against doing so because of limitations in this procedure, and the possibility of obtaining provincial approvals by way of updating its planning strategy and land-use by-law.

In September 1992, the Planning Strategy and Land-use By-law were submitted to the Nova Scotia Department of Municipal Affairs for approval. The Minister approved both with amendments. All provisions for garden suites were, however, deleted because there existed no authority in the *Planning Act* to control land use on the basis of ownership of a structure.

Over the course of the following two years ICHS worked with the provincial lobby group, Affordable Housing Association of Nova Scotia (AHANS), to lobby the province to give municipalities the desired authority to allow garden suites. In September 1994, the Province confirmed that it was considering draft legislation to amend local planning regulations. In December 1994, Interchurch Housing Society requested that its A-C-T project be terminated since it had no opportunity to influence the proposed legislation.

Although under current legislation there is no process in Kings County which allows a family member to house a senior family member in a garden suite it could be possible in the not too distant future. This project contributed significantly to the initiation of dialogue at the provincial level on developing changes in the *Planning Act* to give municipalities the authority to regulate suites.

Affordability and Choice Today (A.C.T.) Demonstration Project / Interchurch Housing Society, Kentville, Nova Scotia. Prepared by: Rosemary Kinnis, ACT Program Manager, Federation of Canadian Municipalities. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association and Canada Mortgage and Housing Corporation. Ottawa: The Federation: The Associations: The Corporation, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual/bilingue.

HOW THE REGIONAL MUNICIPALITY OF HAMILTON-WENTWORTH STREAMLINED ITS DEVELOPMENT APPROVAL PROCESS: CASE STUDY = MUNICIPALITÉ RÉGIONALE DE HAMILTON-WENTWORTH, PROCESSUS D'APPROBATION DES DEMANDES D'AMÉNAGEMENT: PROJET DE RATIONALISATION DU PROCESSUS : ÉTUDES DE CAS

Between 1994 and 1997, the Regional Municipality of Hamilton-Wentworth (RMHW) in Ontario streamlined its development approval process. It slashed red tape, reduced obstacles to growth, adopted innovative measures to resolve disputes over land use and took measures to stimulate the construction of innovative and affordable housing.

The project had these key objectives:

- eliminate procedural bottlenecks
- reduce or eliminate duplication through better cooperation and coordination among Regional departments
- fast-track innovative and/or affordable housing initiatives
- establish a mediation process at the regional level as a means of alternative dispute resolution
- extend the Region's streamlined methodology to the lower tier municipalities within the region.

The reformed RMHW development approval process features:

1. Adherence to established time frames for approvals.
2. A checklist built into each type of application form to ensure applications arrive complete.
3. Pre-consultation meetings to identify potential problems upfront with development proposals so that issues can be addressed early in the process.
4. A Regional Mediation office that offers alternative dispute resolution services when they are needed.
5. Regional planners and engineers dealing with subdivision plans are working in the same division.
6. Delegation of some responsibilities to the lower tier municipalities.
7. Expanded authority for Regional staff to approve undisputed applications.

The streamlining projects also produced four publications. One guides applicants through the revamped planning process, another through the standards for engineering submissions, the third encourages innovative housing developments and the fourth stimulates the production of affordable housing.

This reformed development approval process has been implemented across the entire Region, offering a standardized service at both the regional and local levels. Builders and developers in Hamilton-Wentworth now have the advantage of improved service delivery, faster application turnaround times, pre-consultation and checklists to ensure everything is in order. All these improvements translate into lower builder/developer input costs that can be passed on to housing consumers.

Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project / Development Division, Regional Environment Department, Regional Municipality of Hamilton-Wentworth, Ont. Prepared by Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations, CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre, Canada

NOTE: Bilingual/bilingue

LEGALIZATION OF SECONDARY SUITES IN SURREY, B.C.: CASE STUDY = LA LÉGALISATION DES APPARTEMENTS ACCESSOIRES À SURREY (C.-B.) : ÉTUDE DE CAS

In 1990, the City of Surrey, British Columbia launched a program to legalize secondary suites that met basic health and safety standards. The objectives of the program were to better manage the impacts of secondary suites on neighbourhoods and municipal services, and to accommodate new convertible housing designs for affordable home ownership.

The legalization process involved the adoption of new zones and regulations. Council, in August 1992, (after consultation with the community) divided the municipality into three types of secondary suite policy areas: areas where secondary suites were to be allowed and rezoned by Council (Area Rezoning); areas where individual units could be rezoned (Spot Rezoning); and areas where secondary suites were not permitted at all (Single-Family Only). The Spot Rezoning designation was eliminated in December 1994.

To facilitate administration, Council adopted a secondary suite policy which included the following five conditions for approval of suites:

- a secondary suite can be located in a single-family home only, not in a duplex;
- the applicant must either own or live in the main unit;
- the secondary suite cannot be larger than 90 square meters;
- one additional parking space must be provided; and,
- only one secondary suite is permitted per single-family home.

To ensure that basic health and safety standards are met, the City also developed various technical and regulatory requirements for the suites.

Despite efforts to legalize suites through the secondary suite program only a handful of properties have been legalized. In 1995, Council authorized the formation of a committee to review the program. The main concerns the committee examined were that the suite process is quite complex and lengthy; suites are not permitted in many areas; and Surrey is not collecting very much of the potential tax and licensing revenue from properties with suites. It explored these issues in depth and developed draft solutions. A staff report containing recommendations based on the Committee's draft solutions was approved by Council in September 1996. It forms the basis for a new approach to regulating secondary suites in Surrey.

This approach is aimed at accomplishing the legalization of more suites through an easier and simpler administrative process for the public, Council and staff. Changes will be made to the by-law enforcement and revenue collection procedures and this could lead to improvements in services to areas in which suites are provided.

Affordability and Choice Today (A.C.T.) Case Study Project / City of Surrey, British Columbia. Prepared by: Rosemary Kinnis and David Scherlowski. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; and Canada Mortgage and Housing Corporation. Ottawa: The Federation: The Associations: The Corporation, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual/bilingue.

LEVYING DEVELOPMENT COST CHARGES ON A SQUARE-FOOT BASIS: CASE STUDY = L'ÉTABLISSEMENT DES DROITS D'AMÉNAGEMENT AU PIED CARRÉ : ÉTUDE DE CAS

Development cost charges (DCCs) are applied by municipalities to help offset new capital costs created by new development. Capital costs include the costs of construction and expansion of capital facilities (e.g. roads, sewers, or park land), as well as related planning, engineering and legal costs. DCCs can represent a sizable portion of the cost of producing a new home. The basis for levying DCCs can significantly influence housing form. Municipalities in many provinces have usually charged DCCs on a flat-fee lot or unit basis, which does not take into account the size of a lot or dwelling. When development costs increase in direct relationship to the number of units created, a greater number of smaller homes become more expensive to build than fewer, larger homes. In this way, the flat-free approach may discourage the production of modest-sized housing that is affordable to a growing number of one- and two-person households.

Alternatively, charging DCCs on a square-foot basis can contribute directly to greater housing affordability and choice. This approach can balance the financial incentive, or imperative, to build large lots and dwellings, in order to encourage the development of smaller lots and dwellings. In this way, the square-foot approach can contribute to keeping both land and housing prices affordable to single- and low-income earners, and those living on fixed-incomes, such as seniors.

The Urban Development Institute (UDI) Pacific Region presented the idea of charging DCCs on a square-foot basis to municipalities in the Greater Vancouver area. The municipalities requested a technical and legal analysis before proceeding any further. UDI was awarded an A.C.T. grant in 1992 to undertake this analysis, develop a square-foot model for levying DCCs, and produce a model by-law. The project team's research suggests that levying DCCs per square foot presents the best solution to providing developers with an incentive to build a mix of housing sizes where it is possible to define a specified area or sector; allocate land use and density; and determine a likely population estimate for the area.

Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project / Urban Development Institute Pacific Region Vancouver, British Columbia. Prepared by Energy Pathways Inc. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations, CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual/bilingue.

MEDIATION AS A TOOL TO RESOLVE LAND-USE DISPUTES: HOW KAMLOOPS INTEGRATED MEDIATION INTO ITS LAND DEVELOPMENT APPROVAL PROCESS: CASE STUDY = LA MÉDIATION : UN OUTIL DE RÉSOLUTION DES CONFLITS SUR LES UTILISATIONS DES SOLS : COMMENT KAMLOOPS A INTÉGRÉ LA MÉDIATION DANS SON PROCESSUS D'APPROBATION DES PROJETS D'AMÉNAGEMENT FONCIER : ÉTUDE DE CAS

The traditional tool used to resolve land development disputes is the public hearing process. Adversarial in nature, it often produces a win-lose outcome that may only deepen the bitterness and divisions in a community. Recognizing these shortcomings, cities across the country are designing new strategies that aim to increase public participation in community growth decisions without strangling needed development. Many of these approaches, however, carry price tags that make them inappropriate for councils under pressure to hold the line on taxes. Kamloops Council was in this situation so it decided to provide the option of mediation at the rezoning stage as a cost-effective way to enhance public involvement in land development proposals.

The City first tried using its own planners in the role of mediators. While this proved to be an inappropriate role for city planners, their efforts did prove that mediation could work. Thus encouraged, the City authorized an Alternative Dispute Resolution (ADR) Task Force to help the city design a mediation process that would be part of the City's development approval process. The City was awarded an A.C.T. grant to help defray the costs of developing and implementing the mediation process.

The process, approved by Council in February 1996, set up a Mediation Services Group composed of residents from the community who would mediate land-use disputes on a volunteer basis. The mediators were screened to ensure they did not belong to any groups related to the development industry or to anti-development organizations. They attended workshops where they were taught land development issues and procedures and the theory and techniques of alternative dispute resolution. Now a developer, foreseeing public resistance to a proposal, can ask the City to approve mediation to resolve the potential dispute before the proposal goes to a public hearing. Developers applying for the service pay a nominal fee of $350 - kept deliberately low to encourage its use.

The initiative resulted in regulatory reform as the City had to amend its land development approval by-laws to formally include the mediation option. Other municipalities can also benefit from the Kamloops initiative, which provides a model they can follow to include mediation in their own operations.

Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project / Development Services Department, City of Kamloops, British Columbia. Prepared by: Word-Works Communications Services. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; and Canada Mortgage and Housing Corporation. Ottawa: The Federation: The Associations: The Corporation, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual/bilingue.

ORCHARD NEIGHBOURHOOD: A MODEL FOR COMMUNITY ARCHITECTURE = ORCHARD NEIGHBOURHOOD: UN MODÈLE DE SOCIO-ARCHITECTURE

Community involvement as a fundamental component in residential development is gaining increasing attention. Homeowners and community planners are seeking ways to successfully involve residents in defining development goals and criteria for their neighbourhoods. While it is generally accepted that input from local residents during planning and development is desirable, input in many communities may be limited to reaction. Plans are drawn up and community members are asked to respond. The term "community architecture" refers to the process of bringing residents and planners together in partnership to address the development needs of a neighbourhood from the outset. Residents, rather than planners or developers, take the lead role in determining the acceptable criteria for future neighbourhood development. This requires residents to be active in the planning process, rather than simply reacting to proposed plans and regulatory amendments at public hearings. This community-based approach was used to develop recommendations for a 12-block area in the Town of Sidney, located on Vancouver Island in British Columbia. The residential area is a relatively old, established community referred to as "Orchard Neighbourhood" for the purposes of this project.

Humanité Services Planning (B.C.) Ltd. received an A.C.T. grant in 1992 to proceed with a project that aimed to achieve three main goals: define a planning process that would involve the community; facilitate the development of innovative and affordable housing; retain the character of the neighbourhood. The project included a survey of homeowners in the area, an information meeting and a community workshop. Based on this input, the project team developed several key recommendations focusing on the formal structure and planning process for community-based planning. One recommendation called for homeowners in the 12-block area to incorporate a society representing the interests of Orchard Neighbourhood. The creation of the "Orchard Neighbourhood Society" (ONS) proved an essential step in achieving community-based planning. Municipal staff recommended changes to the Town's Official Community Plan, by-laws, regulations and the approval process to make the ONS an officially recognized and integral part of the development process. Other recommendations related to encouraging innovative design and a variety of housing types and options provided they complement the existing character of the neighbourhood; creating development guidelines; and making specific street, lane, pedestrian crossing and traffic control improvements.

Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project / Town of Sidney, British Columbia. Prepared by: Humanité Services Planning (B.C.) Ltd. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association and Canada Mortgage and Housing Corporation. Ottawa: The Federation: The Associations: The Corporation, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual/bilingue.

PLANNING AN ARTISAN COMMUNITY: CASE STUDY = PLANIFICATION D'UNE COMMUNAUTÉ ARTISANALE : ÉTUDE DE CAS

In 1994, the City of Sainte-Geneviève, a small municipality located on Montreal's West Island, was awarded an A.C.T. grant to carry out a demonstration project that would encourage the development of affordable, mixed-use artisan accommodation. The project was part of an initiative called *Sainte-Geneviève, Ville artisanale*, aimed at encouraging artisans to establish themselves in the community. The municipality conceived this plan to revitalize its downtown core and stimulate economic growth. With many centrally located buildings vacant, businesses closing and a working population migrating to neighbouring towns, the project was considered critical to the community's survival.

The project involved consultations with local artisans, property owners, and representatives of other municipalities with sizable artisan communities.

The City of Sainte-Geneviève introduced two innovative regulatory changes in order to encourage the development of accommodation that would meet the needs of artisans:

- The Municipal Development Plan was modified to permit artisans to live, work and sell their products from their workshop or residence; and to create artisan districts or zones.
- A Siting and Architectural Integration Plan was adopted that would allow flexibility in applying regulations, while preserving heritage, character and standard of living quality objectives through specialized criteria.

The demonstration building is a converted garage on property owned by a cabinetmaker and his family. The cabinetmaker, in consultation with the project team, added a second floor over the garage adjacent to his heritage home to display and store furniture. The ground floor of the building was converted into a workshop and an office. The building's new façade harmonizes with the City's architectural heritage, providing an attractive example and stimulus for other artisans and property owners. The A.C.T. renovation project fully embodied the City's objectives in establishing mixed-use accommodation for artisans.

Sainte-Geneviève, in encouraging mixed-use accommodation, is reviving a tradition of working artisans that is very much part of the community's heritage. The initiative is also encouraging small business, the primary area of employment growth in Canada, and making home-based businesses an important part of local development.

Affordability and Choice Today (A.C.T.) Demonstration Project / City of Sainte-Geneviève, Sainte Geneviève, Quebec. Prepared by Energy Pathways Inc. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations, CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual/bilingue.

PLANNING COHOUSING = LA PLANIFICATION DES ENSEMBLES D'HABITATION COMMUNAUTAIRES

Creative Communities, a multi-unit housing builder/developer, and the Collaborative Housing Society received an A.C.T. grant in 1993 to research and produce a handbook on planning and zoning issues that affect cohousing projects.

The project team worked with cohousing groups and municipalities in the Greater Toronto Area to develop the handbook, which was intended to serve two main purposes:

- To assist groups in understanding the development approval process;
- To help municipal planners understand the concept of cohousing and appreciate the intentions of cohousing groups.

Research conducted for the project involved the following components:

- A survey of the specific development needs and interests of cohousing groups and their experience with, and perception of, the planning process;
- A survey of the regulatory environment, involving interviews with representatives from four municipal planning departments;
- A one-day charrette involving cohousing groups and municipal planners.

The research showed that cohousing groups and planners can benefit by working together. Municipal planners can help groups understand the planning process, and groups can help planners understand the benefits inherent in cohousing development. In some cases where regulatory barriers were encountered, cohousing groups have worked with planners to arrive at mutually beneficial solutions.

External collaboration with planners and neighbours emerged as being as significant to the success of a cohousing development as internal collaboration within a cohousing group itself. The project team found that a lack of such collaboration early in the process could pose a real barrier to cohousing development, and that open dialogue was a critical factor. Representatives from each of the four municipal planning departments involved in the project were interested in supporting the cohousing option, especially as they learned more about individual cohousing projects and understood them.

Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project / Creative Communities and the Collaborative Housing Society, Toronto, Ontario. Prepared by: Energy Pathways Inc. Prepared for: Federation of Canadian Municipalities; Canadian Home Builders' Association; Canadian Housing and Renewal Association; Canada Mortgage and Housing Corporation. Ottawa: The Federation: The Associations: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual/bilingue.

REGULATORY OBSTACLES TO INNOVATIVE HOUSING

Healthy housing, an inclusive approach to developing housing that is environmentally, socially and economically responsible, calls for innovation and is potentially one of the most important challenges facing policy makers, municipal authorities, design professionals and the building industry today. All innovation in a highly regulated field, including housing development and construction, is constrained by existing laws, codes and policies.

This report documents the regulatory obstacles encountered in the development of seven unconventional healthy housing projects undertaken across Canada between 1992 and 1997. The report highlights the Vancouver Healthy House (Vancouver, BC), the Alberta Sustainable Home/Office (Calgary, AB), the Armour-Crainford House Renovation, (North York, ON), the Toronto Healthy House (Toronto, ON), the Innova House (Kanata, ON), the North Mountain House (Arlington, NS), and the Slatkoff-Boisclair House and Studio (Gore, QC). In addition, information is provided from brief reviews of 14 other homes with innovative features.

Prepared by Habitat Design + Consulting and Archemy Consulting Ltd. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Mark Holzman. Ottawa: CMHC, 1998. 58 pages

Order number: PE0302 (61581)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Obstacles réglementaires à l'innovation en habitation.

REVIEW OF PERFORMANCE-BASED ZONING, TOWN OF MORINVILLE, ALBERTA: CASE STUDY = EXAMEN DU ZONAGE BASÉ SUR LE RENDEMENT, VILLAGE DE MORINVILLE (ALBERTA) : ÉTUDE DE CAS

In 1996, the Town of Morinville investigated the current state of the art in alternatives to traditional zoning, and how they could be applied in smaller communities such as their own. Morinville needed to update its Municipal Development Plan to bring it into conformity with the province's new Municipal Government Act.

In addition, the Town was discussing a joint venture development proposal from a local group. They envisaged a high tech community built on the Town's land, in a joint public/private sector project. "Cyberlanes Estates" would be designed for home-based businesses and professionals, with advanced telecommunications and information technologies, and a business centre with offices, meeting rooms, and a media studio. The community was to be designed to the latest standards in both construction and planning, including sustainability, environmental sensitivity, security, crime prevention and new community resources.

However, their innovative plans were beyond the scope of existing zoning standards for most municipalities. Traditional zoning identifies acceptable uses and dimensions - which can be very restrictive for new uses, or for mixed-use projects. Performance zoning is designed to allow much more flexibility, by identifying acceptable ways of dealing with intensity and impacts, instead of rigid use restrictions.

Morinville and representatives of Cybercity Developments Inc. applied for an A.C.T. grant to investigate performance standards and performance-based planning, develop and compare alternative approval process models including cost-benefit analysis, discuss alternatives with focus groups and report to town council with recommendations and proposals for implementation.

Unfortunately, even though the Town was supportive, the proposal for Cyberlanes Estates did not proceed, so the consultant could not do a specific cost-benefit examination of traditional and performance-based planning tools for the project. Instead, more general principles were identified.

The final report identified pros and cons of the performance-based planning approach. It concluded that some hybrid system of performance and prescriptive zoning is probably the best answer. A pure performance-based model is not recommended, but some key elements would be very useful for the Town's future development.

In fact, the Town's Land Use Bylaws were being consolidated while this A.C.T. project was under way. The mayor reports that the examination of zoning purposes, impacts and alternatives helped produce consensus for increased flexibility in the new bylaws.

This report's recommendations also will be considered during the Town's municipal development plan review.

Affordability and Choice Today (A.C.T.) Regulatory Reform Project. Prepared by: Rowena E. Moyes. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations; CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual/bilingue.

SHARED OWNERSHIP HOUSING PILOT PROJECT: CASE STUDY = PROPRIÉTÉ PARTAGÉE PROJET PILOTE : ÉTUDE DE CAS

In 1991, the City of Trois-Rivières, Quebec, initiated a strategy to revitalize its older residential neighbourhoods. One of the City's primary aims was to make downtown living more attractive to young families, with a view to reversing the loss of population to the suburbs and urban periphery. Trois-Rivières' centrally located neighbourhoods offer residents many advantages, including proximity to urban amenities such as schools, parks, medical services and the recently developed Old Port.

A non-profit housing organization, Habitations populaires Desjardins du Centre du Québec (HPDCQ), has worked in cooperation with the city of Trois-Rivières on a number of renewal projects. As part of the City's revitalization efforts, HPDCQ decided to use a novel approach to the provision of affordable housing, called "shared ownership". By allowing the home buyer to purchase the building first, and the land several years later, at no interest, shared ownership makes homeownership more accessible and affordable. This is especially true in downtown areas where the high cost of land can discourage the construction of smaller affordable homes suitable for first-time buyers.

In spring 1993, HPDCQ was sponsored by A.C.T. to design and construct two small, semi-detached single-family homes in one of Trois-Rivières' older neighbourhoods, using the shared ownership approach. Municipal regulations currently do not permit the development of this type of small-lot housing. In order to construct the two demonstration homes, modifications to various municipal zoning and land development bylaws were required. In particular, the City amended its zoning bylaw to permit the construction of semi-detached single-family homes on a site previously zoned for multi-family housing. Zoning regulations were also modified to reduce side and rear setbacks, minimum lost size and building size. Furthermore, the land development bylaw was amended in order to subdivide the site into two smaller parcels.

This A.C.T. initiative combined innovative financing with a small-house design suitable for low- and middle-income households. By deferring the payment for the land component of a house for several years, shared ownership reduces the upfront cost of purchasing a home, thereby making homeownership more accessible. Small-home infill projects such as this A.C.T. demonstration project not only make more effective use of land in built-up areas, they also increase housing choice in downtown neighbourhoods.

Due to the success of the pilot project, HDPCQ plans to build more affordable shared-ownership housing on a site owned by the City of Trois-Rivières. Other Canadian municipalities can benefit from the lessons learned from this A.C.T. project.

Affordability and Choice Today (A.C.T.) Demonstration Project / Habitations populaires Desjardins du Centre du Québec, Trois-Rivières, Quebec. Prepared by Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations, CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual / bilingue.

SMALL LOT HOUSING: CASE STUDY = CONSTRUCTION SUR LOTS DE PETITE DIMENSION : ÉTUDE DE CAS

Urban intensification has become an increasingly important strategy for maximizing land use within existing municipal boundaries. By the late 1980s, the City of Charlottetown was giving intensification through small lot infill development careful consideration. As in many other municipalities, urban development in Charlottetown had become very constrained, and lengthy delays in the approval process indicated the City needed to review its zoning and development by-law and investigate intensification options.

The City of Charlottetown was awarded an A.C.T. grant in 1992 to meet its objectives by developing guidelines for infill housing and revising its zoning by-law to accommodate this housing form. One of the key findings of the project was Charlottetown's reliance on variances and re-zoning related to infill development. This reflected a lack of flexibility in the zoning by-law, and unnecessarily complicated and lengthened the approval process.

The project team noted that many municipalities have shifted from relying on rigid requirements to allowing flexible performance standards. A number of municipalities have revised their by-laws to combine fixed requirements with flexible performance standards. The project team advised that community input would be an important factor in establishing practical and acceptable performance criteria. The project team concluded that the City could meet its objectives and achieve flexibility through relatively minor adjustments to, and fine-tuning of, existing regulations. Selected sections of the zoning by-law could be amended, and architectural and site development criteria could be established.

Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project / City of Charlottetown, Charlottetown, P.E.I. Prepared by Energy Pathways Inc. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations, CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual/bilingue.

SMALL-LOT SINGLE FAMILY INFILL HOUSING: CASE STUDY = CONSTRUCTION DE MAISONS INDIVIDUELLES INTERCALAIRES SUR DE PETITS TERRAINS : ÉTUDE DE CAS

In November 1990, the City of Victoria received an A.C.T. grant to demonstrate that integrating new housing into established neighbourhoods (infill development) can, under appropriate design guidelines, improve the quality, choice and affordability of housing. The City of Victoria proposed to undertake its A.C.T. project in two phases. In the first phase it would examine community concerns and reflect them in developing clear design guidelines that must be considered when designing infill housing, and in developing a zoning by-law which would regulate some aspects of the houses such as size, proximity to street and parking requirements. In the second phase, the approaches developed in phase one would be tested and demonstrated by building three houses.

The project was launched by first establishing a project team comprising all the key stakeholders: community groups, representatives from the building industry, and City staff and Council. Small lot design guidelines applied in other cities were examined and analyzed to determine their appropriateness for Victoria. The team brought the results of this research to the residents and the development community to obtain their input. With the results of the research and community input, the City proceeded to draft the new design guidelines and zoning by-law.

Construction of the three units was completed in March 1995. Soon after, the City officially launched the demonstration with an opening ceremony and the houses remained open for two weeks to allow for public viewing. An important component of the project was measuring community acceptance. Results indicate that the vast majority of the respondents thought that the project suited the neighbourhood and was a positive development.

All three units have been sold with prices around $204,000, comparing favourably with new single family homes in this location which normally sell for approximately $280,000.

Affordability and Choice Today (A.C.T.) Demonstration Project / City of Victoria. Prepared by: Rosemary Kinnis, Act Program Manager, Federation of Canadian Municipalities. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association and Canada Mortgage and Housing Corporation. Ottawa: The Federation: The Associations: The Corporation, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual/bilingue.

SUBDIVISION REGULATION: MEETING SMALL-TOWN NEEDS: CASE STUDY = RÉGLEMENTATION DU LOTISSEMENT : RÉPONDRE AUX BESOINS DES PETITES VILLES : ÉTUDE DE CAS

In 1991, the Town of Sackville and the Tantramar Planning District Commission were awarded an A.C.T. grant to undertake a project that would provide a small-town model for subdivision regulation, and that would address environmental concerns with regard to subdivision development.

The project involved four phases, the first being a literature review of subdivision planning approaches and regulations in Canada and the U.S. The next phase involved an assessment of the existing subdivision by-law and approval process, in light of the literature review and with further consultation.

The third and fourth phases involved revising and adopting a new subdivision by-law; making changes to and documenting the approval process; preparing a subdivision guidebook for use by planning staff; and compiling engineering standards into a single document.

In adopting the revised Subdivision By-law No. 121, Sackville made significant changes intended to improve land affordability and land use efficiency, and permit a variety of servicing options:

- Subdivisions with private roads were permitted, subject to approval by the Tantramar Planning District Commission.
- Road classifications were defined and width requirements decreased.
- Flag lots were permitted by right.

The project team found the environmental provisions could not be incorporated into the Subdivision By-law due to legislative restrictions. Suggestions regarding environmental features and design guidelines were included in a subdivision guidebook prepared for municipal planning staff, and environmental policies were prepared for consideration in the future review and revision of Sackville's Municipal Plan.

REGULATORY REFORM

Actions undertaken to streamline the approval process included both changes to the process, and clear documentation of the process. Sackville implemented the A.C.T. project team's recommendation that representatives from both its planning and its engineering departments would attend any initial meeting with a developer.

A lack of clear documentation outlining Sackville's approval process and requirements had contributed to confusion and delays. In order to facilitate understanding, compliance, and speedy approval, the team prepared flowcharts and checklists for use by applicants and staff, and developed two detailed documents:

- *Town of Sackville Standard Municipal Specification* - This consolidates all engineering requirements into a single, comprehensive document.
- *Sackville Subdivision Guidebook* - This outlines the approval process, discusses regulatory requirements, and provides design guidelines related to environmental considerations.

Finally, the project team determined that the terminology of the existing subdivision by-law could be confusing to, and not easily understood by, many readers. The revised Subdivision By-law was written in "plain language," for everyone to understand.

Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project / The Town of Sackville and the Tantramar Planning District Commission Sackville, New Brunswick. Prepared by Energy Pathways Inc. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations, CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual/bilingue.

RENOVATION & INSPECTION

BEFORE YOU RENOVATE - RENOVATION GUIDE AND CATALOGUE

Everyone has a different reason for wanting to renovate. Sometimes it's the simple need for a change. Other times, the motivation is more practical. If you wake up one day with a puddle in the basement and a water-stained ceiling, you know you have to act fast. Whatever the case, Canada Mortgage and Housing Corporation (CMHC) can help. For more than 50 years, we've been the nation's housing experts: we know what it takes to make a renovation project run smoothly and successfully. From the planning stage to the final touches, this guide shares our experience and knowledge with you. And it tells you about some of the first-rate resources we've developed to deal with all kinds of renovation issues. Replacing the 1997/98 version, this publication continues to contain step-by-step details on planning a successful renovation, how to hire a contractor, a payback range of typical renovations, a sample contract, etc.

Ottawa: Canada Mortgage and Housing Corporation, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre: Avant de rénover - Guide et catalogue pour la rénovation.

A BETTER WAY TO RENOVATE

This booklet presents seven outstanding renovation projects with different sets of renovation challenges and solutions. These demonstrations are based on the concepts of the house-as-a system, energy retrofitting and healthy housing. Together, they demonstrate how a house of any age can be turned into a healthy, comfortable and energy-efficient home.

Ottawa: Canada Mortgage and Housing Corporation : Natural Resources Canada : Canadian Home Builders' Association, c1998.

Order no. NE2174 (60958)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Une meilleure façon de rénover.

HEALTHY HOUSING RENOVATION PLANNER: RENOVATE THE HEALTHY WAY

The "Healthy Housing Renovation Planner" is a step-by-step workbook to planning a healthy renovation.

Chapter One explains the links between your home, your health and the environment. It presents the key principles of Healthy Housing - contributing to occupant health, reducing energy consumption, conserving natural resources, minimizing environmental effects and balancing cost and practicality.

Chapter Two discusses the health effects of indoor air quality, with special attention to environmental hypersensitivities. A Home Health Checklist guides you through your home to help you identify sources of air quality problems - and solutions to them.

Chapter Three discusses the importance of up-front planning, walking you through the things you should think about before you begin your project. It describes the "house as a system", how you can renovate according to Healthy Housing principles and how you can get the most for your renovation dollar. Chapter Three will help you determine whether you have the skills and the time to do the job yourself. If you decide to hire a professional, Chapter Three gives you the information you need to choose the renovator who is best for you. The Chapter also discusses the critical importance of a written contract, insurance, building codes and by-laws and ways to minimize inconvenience while a project is under way.

The rest of the Renovation Planner deals with typical renovations, both large and small. In each chapter, you'll find several steps to help you plan a healthy and affordable project. Each chapter focuses on key issues involved in the renovation project: taking stock of the part of the house to renovate, evaluating options and strategies for making changes, and making a plan.

There are charts and checklists throughout the Renovation Planner so you can record your observations and your choices . Project planning worksheets help you assemble all the parts of the puzzle in one place. Lists of publications provide you with additional information on the subjects discussed.

Ottawa: Canada Mortgage and Housing Corporation, 1999. 320 pages.

Order number: NE2172 (60957) **Price: $34.95 + GST and handling charges.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Rénovation de la maison saine.

PROMOTING HEALTHY HOUSING AND ENERGY EFFICIENCY APPROACHES IN MAJOR HOME RENOVATIONS: A CASE STUDY ANALYSIS. FINAL REPORT

The current and potential interest of renovating homeowners and renovation professionals in Healthy Housing concepts and approaches was explored through a set of twelve detailed case studies of recent renovations. For each renovation, an analysis of opportunities to integrate Healthy Housing approaches and features was used as a basis for exploring the issues in a concrete way. The intent was to gain insights on ways to better motivate and inform homeowners and professionals about how to improve renovations in relation to the Healthy Housing objectives of energy efficiency, air quality/occupant health, resource efficiency, environmental responsibility, and affordability/adaptability.

Based on the research, it appears that a limited number of Healthy Housing features have become, or are becoming, relatively common in renovations. On the other hand, awareness of many other Healthy Housing features was very low amongst both the homeowners and the renovation professionals interviewed. While it would likely be difficult to motivate and inform most homeowners to the point where they proactively make Healthy Housing choices -- especially in decisions related to building systems versus finishes -- many homeowners may be interested in simple tools that would provide them with a basis for raising Healthy Housing issues with their renovation professionals. Similarly, while renovation professionals may not see direct competitive advantage in promoting Healthy Housing approaches and options, many would likely be willing to provide objective (third party) information on Healthy Housing options to clients. The research points to a number of formats and venues for informing renovating homeowners and renovation professionals, and provides a set of recommendations on how to target efforts.

Prepared by Marbek Resource Consultants. Marbek Project Manager: Rebecca Aird. Prepared for: Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: Don Fugler. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

RENOVATORS AND TECHNOLOGICAL CHANGE IN THE SINGLE FAMILY HOUSING MARKET IN CANADA, 1900-2005

This study examines the dissemination of information about new technology to renovators and the utilization of the new technology by renovators in their renovations of owner-occupied single family detached and semi-detached homes in Canada between the years 1990 and 2005.

Although technological change in the residential renovation industry is gradual and cumulative, it is increasing both in the speed and in the range of new materials, methods and equipment being introduced, especially in the use of electronics in the mechanical and electrical fields and in the use of prefabricated and man-made components. The main trends in the types of technology being used by renovators are: (a) heating, ventilation and air-conditioning products, (b) energy efficient products, particularly windows, and (c) engineered and man-made wood products. These items are designed to increase comfort and convenience, improve the quality of the indoor environment, reduce maintenance, and cut energy costs. In order to remain competitive renovators need to be fully aware of new technology and its implications for controlling costs, increasing productivity and meeting the needs of their clients.

It is becoming more difficult, costly and time-consuming for renovators and even their specialized sub-contractors to keep fully informed about these changes using traditional means of research including trade magazines and trade shows.

Renovators need to devote more attention in the future to the following issues:

- Making the access to information about new renovation technology easier and quicker, yet still economical;
- Upgrading the skill levels of sub-contractors and trades and maintaining and upgrading the skill levels of renovators in reference to the use of new renovation technology;
- Evaluating the potential impact on the home renovation industry of using the Internet and related technology in such areas as searching for information about the existence and use of new technology, finding answers from experts about building science problems, upgrading skill levels, advertising and marketing of products and services, and communicating within the industry about common issues of concern.

Prepared by Donald M. Caskie. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officers: Terry Marshall and Darrel Smith. Ottawa: CMHC, 1998. (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

RENOVATOR'S TECHNICAL GUIDE

Since the publication of the *Renovator's Business Guide* in 1994, a need for a text dealing with the building science of renovations has been recognized. This publication addresses those issues and is expected to be widely used as a reference in the field across Canada. Both *Renovator's Business Guide* and *Renovator's Technical Guide* are publications that complement the many how-to renovation manuals available.

This guide does not attempt to explain how to perform renovations but deals instead with why renovations become necessary. It looks at the performance of the house and the normal and abnormal conditions that can drive the need to renovate. The guide looks at the systems within the house, how they interact and how an alteration to one can cause another to malfunction. It explores both the existing problems of houses to be renovated and the implications of any changes being considered.

The guide is intended as a reference that permits the reader to move through the document from beginning to end. However, the convenient format of the publication also allows for quick reference of specific problems or renovations on an "as needed" basis.

The inclusion of building science "Insights" throughout this guide is meant to increase awareness of important building science issues that are sometimes misunderstood or forgotten during renovation procedures. These and the Healthy Housing Information contained in each chapter reflect growing concerns about occupant health and environment impacts in the renovation industry.

The guide focuses on why problems occur, how to avoid them and how not to create new ones as you renovate a house.

Prepared by Michael Lio, Lio and Associates. Contributors: T.C. Paige Crewson ... et al. Ottawa: Canada Mortgage and Housing Corporation, 1998.

Order number: 6993E (61946) **Price: $34.95 + GST and handling charges. 235 pages

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Guide technique du rénovateur.

RENTAL REPAIR AND RENOVATION IN CANADA

This report presents analysis and data highlights from the Rental Repair and Renovation Expenditure Survey (RRRES). Statistics Canada conducted the RRRES on behalf of Canada Mortgage and Housing Corporation (CMHC). Clayton Research Associates Limited analyzed the information for presentation in this report.

Since 1988, through the Homeowner Repair and Renovation Expenditure Survey (HRRES), Statistics Canada has provided annual information on repair and renovation work undertaken by homeowners. However, no comparable information was available for rental units. The main objective of the RRRES, therefore, was to fill this information gap by collecting information on the expenditures made by landlords on repairs and renovations to rental units. The survey covered only private rental units; public housing units were excluded. As well, the survey excludes spending by tenants on rental units.

Respondents were asked to report repair and renovation expenditures (both costs of materials, and contracted work) for the following types of work: additions, renovations and alterations; replacement of equipment; new installations; repairs and maintenance. The RRRES also collected information on housekeeping costs.

In addition to an introduction, the report contains two main sections:

- "Highlights" summarizes key survey results from the RRRES.
- "Comparison to Homeowner Repair and Renovation Spending" compares the estimates of spending on private rental units with estimates for the ownership units from the HRRES.

In addition to the main report, the report contains three appendices:

- Appendix A reproduces the Labour Force Survey Contact Information Form, which was used to screen participants, and the Rental Repair and Renovation Expenditure Survey questionnaire.
- Appendix B discusses the survey methodology in more detail.
- Appendix C presents detailed tabulations for figures in the main report. These include data on the incidence of repair and renovation spending and the average spending per unit by type of work, region, structural type of building and period of construction.

Prepared by: Clayton Research Associates Limited. Project Manager: Patricia Arsenault. Prepared for: Canada Mortgage and Housing Corporation. CMHC Project Manager: Roger Lewis. Ottawa: CMHC, 1998. (Housing Affordability and Finance Series Research Report)

Order number: PE0316 (61590)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Réparation et rénovation de logements en location au Canada.

RENTAL HOUSING

RESIDUALIZATION OF RENTAL TENURE: ATTITUDES OF PRIVATE LANDLORDS TOWARD HOUSING LOW INCOME HOUSEHOLDS

The objective of this research study was to determine whether or not a gradual process of change in the profile of tenants in the private rental sector is occurring. It was hypothesized that this trend, here labeled "residualization", is evolving and that it may have important consequences for government policy.

The research has employed three approaches to this exploration: a literature analysis; a statistical analysis of existing data on household characteristics; and a qualitative survey of two subgroups of rental investors-- recent vendors and purchasers.

The study concludes by outlining the imperative for some policy attention on the rental market. In particular, it is noted that there is not a level playing field in terms of support for ownership and rental tenure. There has long been a preoccupation with increasing access to homeownership. To the extent that the rental market and homeownership sector are closely related, initiatives to enhance access to ownership contribute to weakening demand in the rental sector and are a factor in the trend to residualization. The residualizing trend has been identified as a factor impacting the attractiveness of investment in the rental sector.

The need for a mixed policy approach is identified. This could include various types of demand side programs, such as shelter allowances and rent supplements, but should also be balanced with initiatives to assist the non-profit sector to acquire existing properties in which the private sector appears to be disinterested. The study found that a large number of properties are put up for sale each year and these are often available at a price that would approach an affordable level for lower income households. Currently however, non-profit organizations do not have the capital to pursue such opportunities.

The study identifies an important distinction between discrimination and prudent management. It is argued that landlords are not necessarily adverse to specific household types, they simply associate risk of default and bad debt with certain characteristics. An appropriate policy response would be to focus on mitigating risk. This could be pursued through some form of insurance program that protects investors against these risks. An insurance program does not entirely mitigate risk, nor would it necessarily eliminate selectivity. However, it would formalize an objective system of risk analysis and could help to reduce the barriers that currently confront many lower income households purely on the basis of stereotyping.

Prepared by Steve Pomeroy, Focus Consulting Inc. CMHC Project Officer: Benoît Sanscartier. Ottawa: Canada Mortgage and Housing Corporation, 1998 (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

LE SECTEUR LOCATIF PRIVÉ ET SA NOUVELLE CLIENTÈLE

This study examines the practices and concerns of multi-rental building owners in Montreal in a context of changing clientèle. Thirty randomly selected owners were interviewed by telephone during July 1998. The owners interviewed own buildings in four Montreal districts.

In theory if not in practice, there seems to be discrimination towards the social status, targeted especially at social welfare recipients. This reflects problems of residualization, i.e., tenants find themselves increasingly as the poorest households. The interviews also indicate that there is discrimination towards immigrants, especially Blacks. Although this study is not statistically valid, it seems nonetheless to indicate that segregation exists. The interviews lead one to believe that discrimination plays a role in having access to housing for certain populations.

The purpose of the study was to determine whether there were ways to support the owners in relation to this new clientèle. Very few owners see the need for support in their work. Several spoke of tenants' rights, difficulties with regard to social welfare recipients, but, except for legislative changes to collect rent from this population, they offered very few solutions. As regards inter-ethnic cohabitation, according to owners, there are few problems. On the one hand, this could confirm the "success story" that other studies have shown in Montréal and on the other hand, that the problems encountered, similar to those identified in the social sector are minimal. However, this lack of problems may also reflect the choice of the owners who try to satisfy their current tenants by choosing other tenants who are not too different.

Prepared by: Luba Serge. CMHC Project Officer: Benoît Sanscartier. Ottawa: Canada Mortgage and Housing Corporation, 1998 (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

UNDERSTANDING PRIVATE RENTAL HOUSING INVESTMENT IN CANADA

The key study objectives were:

- To examine the nature and extent of private rental housing investment in Canada;
- To develop a profile of who is investing in private rental housing; and
- To establish a thorough understanding of what investors and lenders consider in their decision-making process.

The ultimate goal of the research was to provide a solid basis from which public and private sector decision-makers can act in an informed manner.

Rental housing can be divided into two broad sectors:

- Private rental housing refers to units owned by private sector investors; the owner or occupants may have received a government subsidy/incentive at some point, but the units themselves remain in the hands of the private sector.
- Social/assisted rental housing includes any publicly owned rental building, including non-profit and co-op buildings.

It is private rental housing which forms the focus of the current study.

Investment in private rental housing can take a variety of forms, including:

- Developing new "purpose-built" rental properties for own portfolio or for sale to other investors;
- Purchasing rental properties from a previous investor (or developer);
- Holding/owning existing rental properties on an on-going, longer-term basis;
- Converting purpose-built owner-occupied or non-residential space to rental tenure - either temporarily or permanently; and
- Upgrading existing rental properties (i.e. renovation/repair work).

This report covers each of these various types of private rental investment to some degree. However, the emphasis of the analysis, particularly with respect to the development of a profile of rental investors, is on what are termed "active" investors - those who invest in new units, or are purchasing existing units.

The study takes a Canada-wide view of private rental investment. Where available, statistical information is presented for the 26 Census Metropolitan Areas (CMAs). In addition, the following 6 major markets have been selected for more in-depth analysis in some instances: Halifax; Montreal; Toronto; Winnipeg; Calgary; Vancouver. These centres were chosen as they are among the largest rental markets, and also provide for a degree of geographic variation.

Prepared by Clayton Research Associates Limited and Fish Marks Jenkins Real Estate Consulting. Ottawa: Canada Mortgage and Housing Corporation, c1999. (Housing Affordability and Finance Series Research Report)

Order number: PE0335 (61601)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Comprendre les activités d'investissement dans le logement locatif privé au Canada.

RESIDENTIAL DEVELOPMENT

INTENSIFICATION IN URBAN AREAS

This report examines the issue of urban intensification in order to deal with population growth pressures and sprawl. Intensification (also referred to as revitalization or re-urbanization) is a counter-sprawl concept intended to slow the trend toward rampant development of greenfield sites on the urban fringe. Recent studies have found that an intensified development form could result in at least 25% reduction in infrastructure costs and a 40% savings in land consumption. Canadian cities need to encourage mixed-use intensification -- including both new jobs and new housing -- in order to assure efficient public transit, to accommodate changing populations, and to ensure sufficient jobs and population to maintain vibrant urban centres.

Computer visualization is employed in this study to project (in "picture" form) the size, shape, location and appearance of proposed developments and their associated density implications. This technology, which combines geographic information systems and computer-aided design software, is used to illustrate the impacts of intensification on neighbourhoods and the potential visual effects of projects that have not yet been built.

This report demonstrates that:

- Residential and mixed-use intensification is already occurring in some Canadian cities;
- Infill and intensification may be (and have been) effectively employed to increase the stock of affordable housing and to revitalize urban centres; and
- Governments and housing providers must re-think the basis for regulatory controls, rigid building and zoning codes, as well as planning mechanisms which impede the production of low-cost housing;
- Intensification has been achieved by a variety of measures; these include design guidelines in lieu of outdated zoning controls, as-of-right zoning to reduce time delays and processing costs, live/work spaces to promote the provision of both residences and jobs in the city, and the use of density bonuses to encourage concentrated development in key locations (such as transit nodes on major arterials) where revitalization is desirable.

Prepared by Gerald Daly, Richard Milgrom. CMHC Project Officer: Fanis Grammenos. Ottawa: Canada Mortgage and Housing Corporation, 1998. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

ROOFTOP GARDENS

GREENBACKS FROM GREEN ROOFS: FORGING A NEW INDUSTRY IN CANADA

The purpose of this study is to review the benefits of green roofs and vertical gardens, examine barriers to diffusion of technologies in Canada and recommend ways to overcome those barriers.

Green roof and vertical garden technologies offer an outstanding number of public and private benefits including: energy cost savings from increased insulation; increased property values; savings on stormwater infrastructure; air quality improvements; and enhanced aesthetic, health and recreational opportunities.

Barriers to the diffusion of these technologies include: lack of knowledge and awareness; lack of incentives; cost barriers; technical issues; and risks associated with uncertainty. These barriers can be overcome by: compiling a repository of knowledge on the Internet; high profile demonstration projects; government procurement support; government policy and program support; financial incentives such as insurance premium reductions and performance based contracting; and research to address information gaps.

Prepared by Steven W. Peck, Chris Callaghan, Brad Bass, and Monica E. Kuhn. CMHC Project Officer: Susan Fisher. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

SENIORS

ANALYSE DES DÉPLACEMENTS DE PERSONNES SOUFFRANT DE LA MALADIE D'ALZHEIMER DANS UN CENTRE D'ACCUEIL

The growth in the number of seniors with Alzheimer's dementia (AD) represents a major issue in health policies requiring, among other things, that buildings be designed for this client group. With specific knowledge of the residual capacities and limitations of persons with AD, appropriate environmental interventions can be performed. This research project constitutes a step towards understanding the ability of persons with AD to move around in their familiar environment. Conducted in a nursing home, the project was carried out in two stages. First, interviews with the workers allowed for the documentation of residents' habits and the difficulties encountered during their movements. Then, a direct observation of residents with AD was performed along a predetermined path. The observations revealed spatial orientation difficulties among persons with AD, despite the familiarity of the environment in which they live. However, some architectural structures remain identifiable by this client group. It follows that, for persons with AD to be able to orient themselves within buildings, these buildings must meet certain criteria such as a clear identification of the functions of each room, a definite distinction between the various environments crossed, either with architectural elements or interior design features. As well, the monotony encountered, in long corridors for example, forces users to discriminate details, and this is beyond the capacities of persons with AD.

Prepared by Romedi Passini, Hélène Pigot, Constant Rainville, Marie-Hélène Tétreault, and Yves Joanette. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Luis Rodriguez. Ottawa: CMHC, 1997 (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

ÉVALUATION DU PROJET DE RÉAMÉNAGEMENT DE L'ENSEMBLE BENNY FARM: RAPPORT FINAL

The Benny Farm project in Montreal's Notre-Dame-de-Grâce district is made up of 384 housing units. The buildings in which these units are located date from the end of the Second World War. The units are in need of major repairs and increasingly less responsive to the needs of current tenants, since they were designed for families and are now occupied by small households and seniors. In addition to the low occupancy rate of these units, there is under-utilization of the available site (64 units per hectare).

For these reasons, CMHC has decided to refit the site and create 1,200 new housing units, approximately one-fifth of which will be reserved for current occupants, the majority of whom are veterans. Construction of the first phase of the project was completed in the Spring of 1997. This first phase made it possible to move a number of current residents (91 households) to new buildings designed specifically for seniors. The objectives of this research were to assess the relevance and efficacy of various aspects of the resident relocation strategy adopted by CMHC and the degree of appropriateness achieved with respect to residents' needs and expectations on the one hand and the new buildings to which they were relocated on the other.

This research was quasi-experimental in nature, since a pre-survey in the old units and a post-survey in the new made it possible to identify residents' attitudes and behaviours before and after the move. A questionnaire was also completed by eight of the major stakeholders to determine their views on the development and relocation process adopted by CMHC.

This research contributes valuable information, both on the resident relocation strategy adopted by CMHC and on the impacts of the new buildings and new apartments. It demonstrates a high level of respondent satisfaction with respect to the relocation process. The fact that the new units are universally accessible, modern and offer a set of amenities essential to an aging population also proved to be well-advised. Above all, the change of residence had positive effects for Benny Farm seniors, who improved their quality of life while participating in the various project development phases. These positive effects may be summarized as follows: increased mobility, physical and psychological health, residential satisfaction and satisfaction with their social life.

Prepared by Pierre Teasdale, Architect with the collaboration of the firm Écho Sondage and Danielle Maltais. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Luis Rodriguez. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

A FLEXIBLE REGULATORY TOOL: MODEL GARDEN SUITE BYLAW: CASE STUDY = UN OUTIL DE RÉGLEMENTATION FLEXIBLE : MODÈLE DE RÈGLEMENT SUR LES PAVILLONS-JARDINS : ÉTUDE DE CAS

Many Canadian municipalities are looking for ways to provide seniors with appropriate and affordable housing. One municipality, the City of Cowansville, Quebec, is especially interested in the garden suite as a viable alternative to institutional living for independent seniors requiring some support and assistance. The City's Building and Planning Department was awarded an A.C.T. grant in autumn 1994 to create a model bylaw governing garden suites. One impetus for the project was the City's view that existing municipal planning regulations, such as current zoning bylaws, were too rigid to ensure project quality, particularly with respect to the siting and architectural integration of garden suites into established residential neighbourhoods. The goal of this A.C.T. project was to develop a flexible regulatory instrument with which municipalities could effectively manage the installation of new garden suites and the conversion of existing accessory buildings into garden suites. The model garden suite bylaw which resulted from the project provides building permit applicants and municipal decision-makers with evaluation objectives and criteria, as well as an approval process designed specifically for garden suite projects.

The project consisted of four phases: the review and analysis of existing regulatory tools for garden suites in Quebec and elsewhere in Canada; the classification, according to municipal concerns, of the objectives and criteria used in the regulatory models examined in the first phase; the drafting of a model garden suite bylaw containing objectives and criteria which meet the specific needs of the City of Cowansville; and the refinement of the model garden suite bylaw, following consultation with interested parties.

The results of this A.C.T. project will interest other Canadian communities wishing to encourage the development of this innovative housing choice for seniors. The architectural design and site planning objectives and criteria prepared for this A.C.T. initiative were specifically designed both to facilitate the integration of garden suites into existing residential areas and to meet the particular needs of seniors. Municipalities will therefore find the objectives and criteria contained in the draft garden suite bylaw especially useful in evaluating garden suite projects.

Affordability and Choice Today (A.C.T.) Streamlined Approval Process Project. Building and Planning Department Cowansville, Quebec. Prepared by: Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations; SCHL, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE: Bilingual/bilingue.

HOUSING FOR OLDER CANADIANS: THE DEFINITIVE GUIDE TO THE OVER-55 MARKET

Canada's older market - 55 and older - is healthier, more active, more informed, more affluent and more demanding than ever before. "Housing for Older Canadians" is the definitive guide for individuals and organizations who want to design, develop, market, manage and sponsor housing for the "over-55" market. Parts of this book will also be useful for support-service providers and for organizations representing older people and who want to help their members find appropriate housing solutions. The guide is tailored to Canadians, and draws on experiences from Canada and other countries, such as the United States.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE2184 (60961) **Price: $49.95 + GST and handling charges.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Le logement des aînés au Canada.

HOUSING OPTIONS FOR PEOPLE WITH DEMENTIA

One disease that can affect older people is dementia. This is a term used for a group of symptoms that affect mental abilities, including: the ability to remember, reason, make decisions, judge and communicate. There are various forms of dementia: the effects of some can be reversed; those of others, currently, cannot. For those people with a progressive type of dementia, specialized care in specialized environments is required to enhance their abilities and quality of life.

This guide sets out to increase public awareness of new housing options for people with dementia and to encourage the development of more community-based solutions. More specifically:

- it describes a range of housing options designed to meet the particular needs of people with dementia;
- it outlines a range of support services that can help caregivers to fulfil their responsibilities;
- it discusses a number of housing management principles that can help in the care of people with dementia; and
- it discusses environmental design considerations for housing people with dementia.

One of the important concepts presented in this guide is that of "residentiality". Very simply, this concerns the importance of creating a home-like setting for those suffering from dementia. The guide discusses two primary options for those suffering from dementia - to remain at home (whether that is a detached suburban bungalow, a condominium apartment or a dwelling unit in a retirement community), or to move into housing specifically designed for people with dementia. For those who can no longer remain at home, the guide presents a number of housing options where persons with dementia can maintain a comfortable sense of living normally.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE2214 (60967) **Price: $24.95 + GST and handling charges.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Les choix de logements pour les personnes atteintes de démence.

IMPORTANCE DU RISQUE ENVIRONNEMENTAL DOMICILIAIRE DANS LA SURVENUE DES CHUTES CHEZ LES PERSONNES ÂGÉES

Research done in recent years has shown that falls by the elderly are not due to chance and are attributable to a combination of factors pertaining to their physical and psychological state, their behaviour and their physical environment. Contrary to intrinsic factors, the environmental component in the risk of falls, though frequently cited as a contributing cause, has been investigated far less. According to studies published in the past twenty years, it has been estimated that the physical environment accounts for close to one half of the falls which occur in the home. The establishment of an environmental risk level pertaining to elders represents a crucial point in preventing falls. In this study, four objectives were pursued:

- List in order the environmental risk factors which relate to falls based on the opinions of a group of experts;
- Determine the level of environmental risk encountered on a daily basis by the elderly living in their homes;
- Identify high-risk sectors in homes;
- Estimate the correlation between the level of environmental risk and the occurrence of falls.

This study examined residents in the Quebec urban region 65 and over, who are autonomous, active and living in their homes. To ensure a homogeneous sample, participants in the study did not require help to move about (walkers and wheelchairs). Two hundred and eleven appointments were scheduled and 192 visits were made between July 21 and October 6, 1997. The information was essentially collected from two measuring instruments completed by interviewers when they visited, i.e., a checklist of environmental risk elements and a questionnaire dealing with the respondent's characteristics (sociodemographic data, whether they have fallen and their history of falling, the level of activity in the home).

Using a linear measuring scale, a group of experts listed in order the various environmental risk factors. This group consisted of 24 persons and covered three specific areas of interest - health, architecture and retired persons. The respondent had to rate each risk factor by choosing a figure on a linear scale to indicate the importance of the factor.

Prepared by Benoît Lévesque, Isabelle Lamontagne, Pierre Maurice, René Verreault, Suzanne Gingras and Denis Gauvin. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation 1999. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

NEIGHBOURHOOD GROUP HOMES FOR THE ELDERLY: THE PLANNING, DESIGN AND DEVELOPMENT PROCESS

This study focuses on sheltered housing projects, to the extent that they are limited to small numbers of units. The goal of this project was to produce a guidebook appropriate to the Canadian context which analyses and documents the planning, financing, site selection, design, development, start-up and marketing process of a sample of Canadian Abbeyfield Houses, and other small-group housing for the elderly. Case histories were collected with respect to the context and circumstances of their development, the key players in this process and their roles. Comparison and critical analysis of these projects' development experience provides insight into the process of implementing this residential option. The specific problems experienced and their respective solutions are highlighted. The potential contribution of this report to the housing industry is in *facilitating easier and faster development* of supportive group homes in existing neighbourhoods.

The report begins with a general introductory chapter, including background, context and definition of the housing model. This is followed by a brief review of the literature on the topic, highlights of the policy relevance of this research, and a summary of the aims of the study. A brief outline of the methodology is included next, with a full discussion in Appendix B. The main body of the report constitutes presentation of findings organized by key analytical variables, including tables comparing the 22 case studies. These variables are divided between those important before and during development, and those afterward. The three final chapters include a discussion of advantages and obstacles encountered by the project sponsors, a typology of projects highlighting patterns and anomalies, and finally, conclusions and recommendations. This is followed immediately by a list of references and an annotated bibliography, organized by major topic headings, which provides a rich source of information for those wishing to do further research. Project profile sheets, with key facts and illustrations, can be found in Appendix A; Appendix C contains a detailed discussion of case study project selection criteria.

Prepared by Mary Ann Clarke Scott. CMHC Project Officer: Luis Rodriguez. Ottawa: Canada Mortgage and Housing Corporation, 1997. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

PLANNING HOUSING AND SUPPORT SERVICES FOR SENIORS

In 1991, Canada Mortgage and Housing Corporation (CMHC) published Maintaining Senior's Independence in Rural Areas: A Guide to Planning for Housing and Support Services. It was intended to assist rural communities in determining seniors' needs and preferences for housing and support services, and to identify options for meeting them. The publication was based on the results of a study carried out for CMHC's Research Division by Dr. Gerald Hodge and Dr. Gloria Gutman of the Gerontology Research Centre at Simon Fraser University.

Soon after the publication's release, it became evident that it was being used widely across Canada in both rural and urban communities, by people representing a variety of disciplines in the public, non-profit and private sectors. The feedback these users have provided over the past seven years has resulted in a number of improvements to this new edition.

These include modifying the major survey instruments; developing a new section on ways of selecting sample surveys; replacing the section that deals with population data; and complementing the manual tally book with a computerized tallying program. In addition, the focus of the guide has changed to include discussions and considerations that reflect the needs of users in urban as well as rural areas.

This publication was designed to help communities anticipate and plan for the present and future housing needs of seniors while incurring minimal expenses. The publication:

- Provides general information on the aging process in Canada;
- Provides an information model and complete instructions for assessing the housing and support service needs;
- Contains questionnaires, worksheets and reporting forms to gather and analyse facts, as well as step by step instructions for their use.

A computerized version of this guide is available from CMHC under the title SENIORS. It comprises a set of instructions; a set of survey instruments; and a set of analytical routines to facilitate analyses and planning, as well as routines to facilitate reporting. Other features include the ability to export data for transfer to a regional centre for aggregation with data from other community studies, and the ability to combine data at a regional level. SENIORS also contains a built-in population file by age group and sex that is customized for specific communities across Canada.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: NE2014 (60943) **Price: $44.95 + GST and handling charges.

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Planification du logement et des services de soutien à l'intention des aînés.

LES RESSOURCES D'HÉBERGEMENT PRIVÉES DE LA PROVINCE DE QUÉBEC

This study, financed under the External Research Program of Canada Mortgage and Housing Corporation, achieves two main objectives. The study first presents an overview of the regional stocks of private retirement accommodation resources in the province of Quebec based on the inventory taken by the Centres locaux de services communautaires (local community service centres) in 1994-95. It then explores the results of a postal survey on home safety measures adopted in a sample of private accommodation resources in order to better meet the needs of their aging clients.

In its analysis of the provincial inventory data, the study highlights major disparities between regions in terms of the distribution of accommodation resources, particularly when these resources are classified according to size (i.e. the number of places offered). It should be noted here that nearly three quarters (1,432) of the 1,962 resources inventoried offer fewer than 25 places and yet these resources only provide 19.6% (12,913) of the 65,842 places offered in this market. It should also be mentioned that the Montreal and Laval regions offer close to 52.6% (34,631/65,842) of the places in the province and that slightly over 85% of these places are in resources with over 60 residents. Regional stocks of private accommodation resources are therfore structured or developed on the basis of very different profiles.

As for home safety, the study also shows disparities between smaller and larger resources. While a series of safety measures are generally adopted right away by the majority of retirement homes, the measures in place to meet the needs of seniors with cognitive difficulties are very limited.

Prepared by: Daniel Pelletier. CMHC Project Officer: Jean-François Dion. Ottawa: Canada Mortgage and Housing Corporation, 1998 (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

USING THE LAND TRUST MODEL TO FACILITATE AN INTEGRATED DEVELOPMENT: ST. ALBERT PROJECT: DOCUMENTATION AND ANALYSIS

The Communitas Group Inc. are assisting seniors in St. Albert to build affordable housing designed specifically for seniors. The approach combines a community-based land trust with a resident-financed model. Residents contribute equity toward the development to reduce financing costs. A land trust separates ownership of the land from the properties, and helps to maintain long-term affordability. The land trust is also important in phasing in the development to include an initial phase of self-contained apartments and subsequent phases of bungalows and an assisted-living complex. With the financing package and establishment of the land trust complete, the construction was scheduled to begin in the spring of 1998. While developed for seniors, the model is adaptable to any client group. It is necessary that a majority of the participants have access to equity and are able to commit a considerable amount of time on a voluntary basis. Although the initial members who contribute equity to the project are taking on a degree of risk, this is offset by a price discount and the opportunity to have a direct involvement in decisions that affect the quality and design features of the development.

The initiative has noted the importance of pre-development funding. While it was able to access the CMHC Proposal Development Funding to finance initial development costs, the proponents also recommend the development of other forms of seed funding to assist groups in overcoming the high front end costs of initiating a project.

Submitted to Homegrown Solutions by the Communitas Group Ltd. Ottawa: Canada Mortgage and Housing Corporation, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Utilisation du modèle de fiducie foncière pour faciliter l'aménagement d'une collectivité intégrée.

SOCIAL HOUSING

DEVELOPING A PROFILE OF MARKET RENTERS LIVING IN SOCIAL HOUSING

This study sought to develop a profile of market renters living in social housing developed under the N.H.A. 56.1 program and to identify potential differences between market tenants living in social housing and market tenants living in comparable private rental buildings. Included in the analysis is an assessment of the differences across the two groups in terms of their: household characteristics, their current and previous housing situation, their perceptions of community, their support service requirements, their plans for the future including potential for home ownership and their overall satisfaction with their current housing situation. A total of 779 households were surveyed across private non-profit, municipal non-profit and private rental housing and the differences were analyzed to determine whether there were differences which could be considered to be statistically significant across those living in social housing and those living in private rental housing.

Prepared by: Lorraine Copas, Community Focus. CMHC Project Officer: Patricia Streich. Ottawa: Canada Mortgage and Housing Corporation, 1998. (CMHC External Research Program).

AVAILABILITY: Canadian Housing Information Centre

HOME BUSINESS IN SOCIAL HOUSING: A POLICY AND PROGRAM IMPLEMENTATION STRATEGY

The purpose of this report is to identify the elements of a policy and program to permit and encourage the development of home businesses in a social housing setting. The report identifies roles and responsibilities for various housing stakeholders, and the relationships among them and with non-housing partners to make such a policy and program a reality. The report also identifies the manner in which social housing residents can achieve self-sufficiency through home businesses and the types of resources and support required for them to do so.

Prepared by David Bruce. Prepared by Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Phil Deacon. Ottawa: CMHC, 1998. (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

SUSTAINABLE DEVELOPMENT & HEALTHY HOUSING

CMHC'S HEALTHY HOUSE IN TORONTO

This publication provides information on CMHC's Healthy House located in Toronto. Five years ago architect Martin Liefhebber's off-grid self-sufficient house was one of two winners of Canada Mortgage and Housing Corporation's (CMHC) Healthy Housing Design Competition. The winning design met CMHC's criteria that new housing technologies and design be workable, available and affordable for the occupants and the community while going easy on the planet.

Although there are many Canadian homes that have energy and water conservation features, Liefhebber's design integrates the additional Healthy Housing principles of good indoor air quality, affordability and environmental responsibility. The four-storey, semi-detached house is located in an established neighbourhood in downtown Toronto, and because the house requires no hydro, water or sewer connections, it was possible to build on a lot that normally would be too expensive to develop.

The publication covers the thermal energy system and water treatment systems, details the design team, and describes the products used in the house construction.

Ottawa: Research Division, Canada Mortgage and Housing Corporation, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : La maison saine de la SCHL à Toronto.

DEVELOPMENT OF COMMUNITY-BASED SOCIAL MARKETING APPROACHES FOR ACHIEVING SUSTAINABILITY: FINAL REPORT

In addition to technological innovation, the movement to a sustainable future will also require changes in the individual attitudes and behaviours of Canadians. However, while a wide variety of programs have been effective at shifting environmental attitudes, few programs have had much success at shifting related behaviours. Correspondingly, despite the environmental commitment of Canadians, we are proving to be slow in adopting sustainable lifestyles and in using related products and services. Furthermore, the body of knowledge regarding how to promote conserver behaviours is poorly developed at this time, and there are few models for program planners and implementers to work with.

This project was therefore designed to help overcome these obstacles. It's objectives were:

- to advance understanding of how to develop and implement community-based social marketing approaches for bringing about and maintaining conserver behaviours, and
- to rapidly disseminate this understanding to current and potential program planners and implementers across Canada, by means of a "hands on" workbook and five training sessions (including a "train the trainer" component) presented across the country.

In order to accomplish the objectives listed above, the following work was undertaken:

- the project built on a theoretical framework originally developed from the academic literature,
- primary research was conducted with ten Canadian sites,
- fifteen additional case studies from across North America were selected for secondary research,
- the results were synthesized into a workbook and workshop, which were market tested, peer reviewed, produced and delivered, and
- partnerships were developed with key stakeholders across Canada, including community and environmental organizations, businesses, and all levels of government.

Prepared by: Jay Kassirer, Cullbridge Marketing and Communication, and Pinecrest Queensway Community Economic Development Group, Inc. registered and known as "West End Community Ventures". Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: Sue Ann Rothwell. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

OPTIMISATION MICRO-CLIMATIQUE DE LA BANLIEUE NORDIQUE EN FONCTION DU VENT

This research proposes to analyze wind behaviour in the outdoor areas of a typical existing suburb in view of identifying and modifying the critical discomfort zones through architectural and landscaping interventions at the parcel and public area level. The observation and interpretation of snow accumulation simulated using a hydraulic tunnel that becomes a global integrator allowing for a visual synthesis of the complex behaviour of the wind. The results, presented in the form of comparative graphs and tables, provide a design tool for architects and other designers in the redevelopment of intensification of existing suburbs. These results incorporate a performance index that integrates the paradoxical aspects linked to the wind, that is, the need for protection in the outdoor rest areas surrounding the residences and the need for natural clearing of snow accumulations in traffic areas. The aerodynamic solutions more specifically respond to the behaviour of the wind in the area of the city of Québec but, given the structural uniformity of suburbs regardless of any regional disparities, the results can still be generalized to all Canadian suburbs.

Prepared by André Potvin with the collaboration of Carole Després. Prepared for the Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Chris Ives. Ottawa: CMHC, 1998 (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

RYDER LAKE "URBAN VILLAGE": DEVELOPMENT PLAN FOR A SUSTAINABLE COMMUNITY = LE VILLAGE URBAIN DE RYDER LAKE : PLAN D'AMÉNAGEMENT POUR UNE COLLECTIVITÉ DURABLE

Chilliwack, a community of sixty-five thousand located in British Columbia's Lower Mainland region, has responded to the challenge of accommodating a fast-growing population in an environmentally responsible manner by launching a project to build a sustainable community or "urban village" on 2,500 hectares in the adjacent hillside area of Ryder Lake. Recognizing the groundbreaking nature of such an initiative, in fall 1994, the ACT Program awarded the District of Chilliwack's Municipal Development Department a grant to be used towards the preparation of a plan, including development policies, standards and guidelines, for a high-density, compact community of approximately 40,000 people. A related goal of this project was to create an efficient approvals process for permit applications for development in Ryder Lake.

This ACT project resulted in the preparation of the Ryder Lake Area Plan ("The Plan"). The Plan proposes the use of a combination of flexible regulatory tools to guide the development of the Ryder Lake sustainable community. As a starting point, the District designated the entire Ryder Lake area as a "Development Permit Area" under the Municipal Act. This approach allows the District to protect the natural environment and to establish guidelines regarding the form and character of commercial and multi-family development. Furthermore, construction in Ryder Lake will be regulated by the application of performance standards rather than conventional prescriptive standards which are typically used to control suburban development. By focusing on the objectives and intent of the design, performance standards provide municipal authorities with an acceptable amount of control over the development process while, at the same time, enabling developers to build in a more creative manner.

The goals of the ACT Program - improving housing affordability, choice and quality through regulatory change - are clearly reflected in the development of sustainable communities such as Ryder Lake. The results of this project are very much applicable to other communities wishing to plan growth and development in a way that enriches the lives of its citizens while respecting the environment.

Affordability and Choice Today (A.C.T.) Demonstration Project / District of Chilliwack, British Columbia. Prepared by Julie Tasker-Brown. Prepared for: Federation of Canadian Municipalities, Canadian Home Builders' Association, Canadian Housing and Renewal Association, Canada Mortgage and Housing Corporation. Ottawa: The Federation; The Associations; CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

SUSTAINABILITY IN PRACTICE: REDUCING CONSTRUCTION WASTE IN THE ONTARIO RESIDENTIAL CONSTRUCTION INDUSTRY

One of the major challenges facing all advocates of sustainable development is putting theory into practice. The sound management of construction waste is one of many factors related to sustainable development that must be addressed by the housing industry. The objective of this project was to identify the most effective strategies for minimizing residential construction waste in Ontario. This involved looking at work already done on the subject, as well as interviewing several builders on their waste management practices. As a result of a collaboration between a consulting firm, Habitat Associates, and the Ontario Home Builders' Association (OHBA), regulatory mechanisms were downplayed in favour of identifying *voluntary* ways to cut waste, and earmarking ways to effectively *implement* a strategy to assist home builders with minimizing waste.

The study was conducted in two phases. Phase 1 analyzed construction waste management practices in Ontario, including waste generation rates, trends and individual reduction initiatives. Key considerations for implementing a waste reduction strategy for Ontario were identified, and in Phase 2 an implementation strategy to be led by the OHBA was developed.

Several conclusions were drawn from the first phase of the study, but two emerged as key to addressing the objectives, i.e. facilitating voluntary acceptance of waste minimizing practices and enhancing the reach and impact of the message. First, minimizing construction waste generation should be emphasized over separation and recycling. Reduction is typically the preferred of the 3Rs, but besides being the most effective way of minimizing waste, it has the potential to save money. This message is capable of attracting attention, encouraging serious consideration, and permanently changing practices. Reducing materials consumption also has a truly positive environmental impact. Secondly, builders' practices are very diverse, suggesting that there is considerable opportunity to increase awareness about waste avoidance techniques. Effectively reaching all those with a role to play in reducing waste is not easy, and therefore will require effort. Significantly reducing waste will involve improving awareness of both the general benefits of waste reduction as well as specific techniques that can reduce waste.

The second phase of the project was devoted to developing an outreach program. Based on the conclusions of Phase 1, five potential outreach strategies were formulated. Builders and others were asked to comment on the effectiveness of each alternative strategy. Based on builders' feedback and the experience and resources of the OHBA, a grassroots strategy to assist Ontario builders to reduce waste was selected. Two products were generated. The first is a kit designed to assist local Home Builders' Associations (HBAs) with initiating a local campaign or event to raise awareness of the benefits of waste reduction. The second document provides details that can be used as background information by those hosting an event, and can also be used directly by home builders. It contains practical information, testimonials and cost-saving data.

Prepared by Teresa Paul, Habitat Associates with the Ontario Home Builders' Association. CMHC Project Officer: Terry Marshall. Ottawa: Canada Mortgage and Housing Corporation, 1997 (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

SUSTAINABLE COMMUNITY DESIGN

This project sought to identify the features of a sustainable community and how they can be applied to the design of a new community. Several Canadian and international examples of built or proposed communities were used to seek out theses features. It also tried to test consumer response to these design features by using images and facts from these example case studies and from a proposed design for a Canadian subdivision.

The study results are incorporated in a CD-ROM. It presents 150 sustainability features organized in distinct categories ranging from the house scale to the large community level. Text and images describe each feature and its effect on sustainability. All features are linked to a set of case studies where they are shown with pictures, drawings or diagrams. A list of references supports each aspect of community design along with Internet connections to many original sources. This component of the disc provides an extensive and comprehensive check list of all the elements that need to be considered in the design of a sustainable community. The visual descriptions of these elements would assist a designer in setting a starting point for a planned new community.

Visualizing the attributes of a sustainable community can also help gauge consumer reaction. The disc includes a complete questionnaire, in a sequence of electronic images, that can be used as a means of exploring the market for innovative features which cannot be found and experienced in real life settings.

Prepared by Eduard Epp, Richard Perron, William T. Perks, Chris Sale, David van Vliet.

Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

NOTE: CD-ROM available by interlibrary loan only.

AVAILABILITY: Interlibrary Loans , Canadian Housing Information Centre

TREE CARE

TIPS FOR POST-STORM TREE CARE

This fact sheet on post-storm tree care was prepared in response to the ice storm in Eastern Ontario and Quebec. Tips are provided on how to clean up broken branches and remove torn bark, how to maintain tree vigour, and how to hire a contractor. Sources of further information are included.

About Your House Fact Sheet; CE 12. Ottawa: Canada Mortgage and Housing Corporation, 1998.

Order number: 60360

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Le soin des arbres après la tempête.

URBAN TRANSPORTATION

PLANNING AND MANAGING TRAFFIC NOISE ON URBAN ROADS: INTERNATIONAL AND CANADIAN EXPERIENCE

Traffic noise on major roads in urban areas is viewed as an environmental issue with serious quality of life impacts in Europe, Australia and elsewhere. The paucity of current Canadian literature on the subject would suggest that Canada has little experience with this issue. This research identifies and describes fifteen planning and management approaches used in other countries to minimize the effects of traffic noise on residents living near arterial streets. These range from public education campaigns to low noise road surfaces, and are categorized by type of measure. Canadians should be aware of the existence of these options for addressing urban traffic noise issues. A brief survey of Canadian municipal and provincial officials reveals a general concern with traffic noise, and a range of arterial road traffic noise policies and practises, from none at all to quite comprehensive. Recommendations for further research are offered focusing on basic data gathering, current federal road and rail noise guidelines, and information dissemination.

Prepared by Margaret Eberle. CMHC Project Officer: Paula Archer. Ottawa: Canada Mortgage and Housing Corporation, 1997. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

AN APPLICATION GUIDE FOR WATER REUSE SYSTEMS

This guideline application document is intended for those involved in the analysis, design, specification and operation of water reuse systems; to those who wish to become familiar with current developments in innovative water treatment systems and broaden their knowledge of water reuse problems and their solution. The contents will be of particular interest to engineers, managers, technical personnel and regulatory authorities. Information presented in this guide will be useful as a design and approval submission checklist. A how to get started and information required reference if you wish.

This water reuse application document is not intended to deal with issues associated with treated wastewater disposal to the environment and/or associated water quality discharge objectives.

References to specifications, studies and other publications are provided which can be consulted for further information on design practices and requirements for water reuse systems. A sample application form with instructions is also included which may be helpful to both applicants and review agencies. It is hoped the information provided in this document will assist in the development of approval submission procedures, guidelines and standards for water reuse applications.

Prepared by Totten Sims Hubicki Associates. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Cate Soroczan. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Guide de demande pour les systèmes de réutilisation de l'eau.

CASE STUDIES OF POTENTIAL APPLICATIONS OF INNOVATIVE RESIDENTIAL WATER AND WASTEWATER TECHNOLOGIES

Objectives of this project were to identify and describe opportunities for use of innovative water supply and wastewater systems for residential buildings, to compare costs and benefits of traditional and innovative systems, and to propose solutions that could lead to more cost-effective and environmentally friendly housing. The innovative technologies considered are those used in the Toronto Healthy House: a rainwater cistern system, and recycling of all household wastewater, for non-potable uses. In five case study sites in Nova Scotia, life cycle costs of these technologies were compared with costs of traditional infrastructure alternatives -- municipal water and wastewater, or wells and on-site sewage disposal systems. These comparisons indicate that the Healthy House technologies could be cost-competitive in an urban or suburban subdivision if fire protection is not required; a non-urban area as an alternative to a cluster system, or in a non-urban area as an alternative to a remedial central system. Other situations where they might be appropriate are also discussed. Other non-cost issues -- technological, management, regulatory, and public and political -- that must be considered if these technologies are to be adopted are identified and discussed. Recommendations are offered about strategies and actions that can take advantage of opportunities and address problems and issues related to adoption of innovative technologies for residential water supply and wastewater management.

Prepared by D.H. Waller, M.A. Salah, Centre for Water Resources Studies, DalTech. CMHC Project Officers: Peter Russell, Stéphanie McFadyen. Ottawa: Canada Mortgage and Housing Corporation, 1999. (External Research Program)

AVAILABILITY: Canadian Housing Information Centre

EVALUATING THE PERFORMANCE OF ON-SITE SEWAGE DISPOSAL SYSTEMS

On-site sewage disposal systems serve a significant proportion of the population of Canada. These systems provide a cost-effective alternative to central systems when they function properly. But they can and do malfunction, resulting in surface contamination where the soil system is unable to accept the septic tank effluent, or ground water contamination where the local soil system does not provide adequate treatment.

A study undertaken by the Centre for Water Resources Studies for CMHC concluded that "There is no simple, routine, or certain procedure to assess the capacity of an on-site system; a detailed assessment will be site-specific and will rely heavily on the knowledge and experience of the individual who conducts the examination." (Hennigar, 1993). The same report identified a field test, developed in California (Hantzshe, 1991), that has been used to assess the hydraulic capacity of soil absorption systems, and recommended evaluation of this procedure for Canadian conditions. Evaluation of that procedure is the subject of this report.

The objectives of the project reported were to:

- document experience with use of the leachfield evaluation test, by site visits and literature review;
- apply and evaluate the test under field conditions in Nova Scotia; and
- evaluate the test using a spreadsheet water balance model.

Prepared by D.H. Waller and J.D. Mooers. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officers: Al Houston and Chris Ives. Ottawa: CMHC, 1998 (External Research Program).

AVAILABILITY: Canadian Housing Information Centre

INNOVATIVE RESIDENTIAL WATER AND WASTEWATER MANAGEMENT: WASTEWATER RECYCLING AND REUSE, RAINWATER CISTERN SYSTEMS, AND WATER CONSERVATION

The purpose of this report is to make those responsible for planning and management of water and wastewater systems aware of, and to provide information about, three technologies that have the potential to address water and wastewater problems that face, or will face, many Canadian communities: wastewater recycling and reuse, rainwater cistern systems (RWCS), and water conservation. Most of this report addresses recycling and reuse of wastewater for non-potable applications, because water conservation, and to a lesser extent RWCS, are more widely used and accepted and more completely documented.

Section 1 provides the background to and methodology used in this project, and reviews terminology used in discussion of wastewater reclamation, recycling, and reuse. Section 2 identifies areas and situations in Canada that might benefit from use of the technologies. Problems exist from coast to coast, from north to south, and in both urban and rural areas. Section 3 deals with innovative on-site systems. Examples and references are provided for residential water conservation and RWCS, but the emphasis is on recycling and reuse in residential and other single buildings. Seventeen case studies are provided, of systems in Canada and internationally, and 15 treatment components or systems are described, which have been used, or have the potential for use, in small-scale wastewater non-potable recycling and reuse systems. Section 4 provides examples of municipal innovations in water and wastewater management. A recent Canadian report provided a summary of Canadian municipal water conservation initiatives. Examples of wastewater renovation, recycling, and reuse are drawn from many references that provide examples from around the world.

Examples of direct and indirect potable reuse are reviewed, and information is included about systems where these options have been investigated or used; but most of the examples relate to wastewater reuse for non-potable purposes such as irrigation, or dual municipal systems for delivery of potable and non-potable water. Potential applications for dual systems include: areas where water resources are limited, and inter-basin transfer of raw water is less acceptable than in the past; locations where water demand is expected to exceed the yield from existing facilities, and non-potable uses can be met at lower cost by reclaimed wastewater; the possibility of treating raw water from a polluted source for non-potable uses; increasing treatment requirements to meet more stringent environmental standards; and the ready availability of wastewater as a potential source of reclaimed wastewater. Dual systems have been used for toilet flushing, and for other urban public, industrial, commercial, and residential uses that include irrigation, fire fighting, cooling and process waters, construction street cleaning, and car washing.

Section 5 draws on many recent references to review issues, obstacles, and opportunities related to wastewater recycling and reuse. These include: arguments related to the need for potable reuse, and merits of non-potable reuse; health and other water quality considerations; system planning and design; management of small scale and large scale systems; legislation, regulations, and criteria; economic considerations; and research and demonstration needs.

Prepared by D.H. Waller, J.D. Mooers, A. Samostie, B. Sahely, Centre for Water Resources Studies, Dalhousie University. Prepared in collaboration with totten sims hubicki associates, Blue Heron Environmental Technology, Canadian Water and Wastewater Association. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Manager: Cate Soroczan. Ottawa: CMHC, 1998.

AVAILABILITY: Canadian Housing Information Centre

REGULATORY BARRIERS TO ON-SITE WATER REUSE

This report represents the results of an investigation into the existence of regulatory barriers to the implementation of on-site water reuse in Canada. The report explores the barriers which are present in health and environmental regulations, as well as in plumbing/building codes and municipal by-laws. Regulatory barriers are outlined at the national level and within each province or territory, with municipal examples provided.

The results of the report indicate that the most significant barrier to the implementation of on-site water reuse may be the lack of regulations and guidance across the country. Proponents indicated that guidance within provisions of the Plumbing Code would facilitate the acceptance of on-site reuse technology within their jurisdictions. In particular, documented proof of the safety of on-site systems with regard to public health would be of great benefit. No absolute regulatory barriers to on-site water reuse could be identified. Obstacles are instead created largely by attitudes and perception. The solution may lie in creating a Code of Good Practice and documenting case studies in order to provide guidance and confidence to decision-makers.

Prepared by Canadian Water and Wastewater Association. Prepared for Research Division, Canada Mortgage and Housing Corporation. CMHC Project Officer: Cate Soroczan. Ottawa: CMHC, 1997.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Obstacles posés par la réglementation à la réutilisation de l'eau locale.

SUSTAINABLE HOME WATER SYSTEM AT THE ALBERTA SUSTAINABLE HOME/OFFICE

The objectives of the Sustainable Home Water System (SHWS) project were:

- to design an autonomous home water system which includes a rainwater collection, storage, and treatment system; greywater heat recovery; and a greywater treatment and recycling system;
- to install the SHWS at the Alberta Sustainable House as a demonstration prototype;
- to monitor and evaluate the performance of the SHWS and greywater heat exchangers; and
- to determine the SHWS viability in the Canadian housing industry as a retrofit and for new home installations.

The Sustainable Home Water System (SHWS) at the Alberta Sustainable Home/Office reduces total residential water use by 78% compared with average Calgary households.

Collected rainwater is treated on demand to satisfy potable water requirements and meets Canadian Drinking Water Quality Guidelines (1996) for all parameters tested, however aesthetic objectives are slightly exceeded for temperature.

Heat from greywater is reclaimed through the counter current and drum storage greywater heat exchangers contributing 7.4% and 4.4% respectively to hot water heating. In-series operation accounts for 16.8% of the hot water heating required at the ASH home/office.

The greywater is treated using slow sand filters, soil box subirrigation, and a Greywater Garden Wall. The treated greywater conforms to non-potable water guidelines from several US states, apart from the elevated levels of total suspended solids. This reuse water satisfies 86% of the total ASH home/office water demand (i.e. ultra low flush toilet, bathing, clothes washing, and subsurface irrigation).

WATER CONSERVATION, REUSE & MANAGEMENT

The Sustainable Home Water System is a cost-effective, environmentally-friendly, safe home water system which can easily be installed in new homes, and SHWS components can be incorporated into existing residential water systems. Maintenance and operation requirements are inexpensive and require limited time, however, a complete understanding of the system is required. Further research, monitoring, and adaptations to the water treatment system will be continued to improve the SHWS.

Prepared by Jorg Ostrowski and Karen Braun, A.C.E. - Alternative & Conservation Energies, Inc. CMHC Project Officer: Stéphanie McFadyen. Ottawa: Canada Mortgage and Housing Corporation, 1998. (Housing Technology Incentives Program)

AVAILABILITY: Canadian Housing Information Centre

WOMEN AND HOUSING

CANADIAN WOMEN AND THEIR HOUSING: 1997

The specific objective of this research study is to provide a profile and analysis of women, health and well-being related to housing issues in the 1990s. This report, building on and updating a 1983 report Women as Housing Consumers, is intended to provide information for use by academics, students, researchers, planners and housing policy-makers at municipal, provincial, and federal levels, and women generally. The study is also intended to suggest future directions for research, policy and dialogue with regards to healthy housing for women.

Prepared by: SPR Associates Inc. Prepared for Canada Mortgage and Housing Corporation. Ottawa: CMHC, 1998.(Housing Choices Series.)

Order Number PEO313 (61588)

AVAILABILITY: CMHC Information Products

NOTE : Aussi disponible en français sous le titre : Les Canadiennes et leur logement.

YOUTH & HOUSING

GIMME SHELTER: SHARING SUCCESSES IN HOUSING FOR YOUTH: CMHC HOUSING AWARDS FORUM: FORUM HIGHLIGHTS

Canada Mortgage and Housing Corporation (CMHC) organized a two-day forum in 1997, GIMME SHELTER: Sharing Successes in Housing for Youth, to celebrate and promote the accomplishments of many organizations working with youth to provide more housing choices for youth.

More than half the participants at the Forum were youth. Of 148 peoples, 80 were 15-30 years old. The Forum, held in Montreal from October 22 to 24, provided an opportunity to exchange ideas about housing and living environments for youth. It served as a consultation with youth about practical solutions and best practices in housing to meet the needs of young people.

It brought together youth who had stories to share about housing projects and programs they have found meaningful and helpful to them. It included urban planners, environmentalists, housing industry representatives, members of housing agencies and co-operatives, students, teachers, researchers, and government representatives. Everywhere, people were talking, sharing, and telling their stories, the focus being on housing for youth.

Various types of presentations (theatrical, research, experiential, dramatic readings) and workshops gave people many opportunities to think about the issues. Among those dealt with were access to information, financial barriers (such as employment and economic issues, credit references, rent subsidies), discrimination, safety, accessibility, affordability and youth's lack of experience in securing housing for themselves. Participants also learned about housing construction education programs for youth, which not only help youth learn basic residential development and construction skills, but also contribute to developing team-building and communication skills. Partnerships, sustainable housing, and youth involvement in housing design, operation and management were other areas explored.

Participants proposed many solutions. Key ones were networking, partnerships and creating youth-friendly, supportive environments. But even more significant is ensuring that youth are actively involved in initiatives from the outset, beginning with the planning stage.

Prepared for CMHC by Sharon Margison of Communication Dynamics, with assistance from Nicole Jasmin of Nicole Jasmin Consulting; and Sophie Edwards, Consultant. Ottawa: Canada Mortgage and Housing Corporation, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Enfin chez moi! Partager les réussites : le logement pour les jeunes.

GIMME SHELTER: HOUSING FOR YOUTH: CMHC HOUSING AWARDS: SHARING SUCCESSES IN HOUSING FOR YOUTH

This portfolio contains information sheets on the 16 projects chosen by the Awards Selection Committee featured at the CMHC Housing Awards Forum. All offer practical solutions to challenges facing youth. They also demonstrate ways in which youth themselves are involved in addressing issues, in cooperation with others. Many organizations have found that they best meet the needs of youth by offering holistic services, including training, employment opportunities, support for continuing one's education, counselling and, particularly with Aboriginal youth, by working to connect youth with their community and traditional roots.

Ottawa: Canada Mortgage and Housing Corporation, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Enfin chez moi : habitation jeunesse : prix d'excellence en habitation de la SCHL - partager les réussites : le logement pour les jeunes.

MORE GREAT HOUSING PROJECTS FOR AND BY YOUTH: 1997 CMHC HOUSING AWARDS: SHARING SUCCESSES IN HOUSING FOR YOUTH

This 27 page document presents descriptions of 47 entries in the awards competition. Categories covered include:

- alternative housing tenures
- community housing initiatives
- financing
- housing design
- housing for youth at risk
- housing for youth with disabilities
- information/education/rights/finding housing
- training/employment

For each entry listed there is a brief description of the project with a contact listed for more information.

Ottawa: Canada Mortgage and Housing Corporation, 1998.

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : D'autres excellentes initiatives de logement réalisées par et pour les jeunes.

Y2K

PREPARING YOUR APARTMENT FOR Y2K. ABOUT YOUR HOUSE SERIES; CE 20

This guide has been prepared to provide you with the necessary information to assess the degree to which the Y2K problem could affect your apartment and building. This guide focuses on the appliances, equipment and systems which provide for your health, comfort and security: local utilities, electricity, water, fresh air, electronic access systems and heating. Information regarding consumer goods such as VCRs, camcorders, stereos, televisions, and home computers can be obtained directly from the manufacturer or the store where you bought them.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: 60375

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Préparer votre appartement au passage à l'an 2000.

PREPARING YOUR HOME FOR Y2K. ABOUT YOUR HOUSE SERIES; CE 16

This guide has been prepared to provide you with the necessary information to assess the degree to which the Y2K problem could affect your home. This guide focuses on the appliances, equipment and systems which provide for your health and security: loss of electric power, loss of natural gas, loss of water supply, and communications. Information regarding consumer goods such as VCRs, camcorders, stereos, televisions and home computers can be obtained directly from the manufacturer or the store where you bought them.

Ottawa: Canada Mortgage and Housing Corporation, 1999.

Order number: 60368

AVAILABILITY: Canadian Housing Information Centre

NOTE : Aussi disponible en français sous le titre : Préparer votre habitation au passage à l'an 2000.

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